

ELECTRICAL REVIEW

FRIDAY
6 MAY 1960

WEEKLY
PRICE 1s 6d

The **NEW** range of—

“MEMREX-EXEL” 500 volt Switchgear

**PRESSED STEEL ENCLOSURES
FOR LIGHTNESS AND STRENGTH.
FRONT OPERATING SWITCH HANDLES.
REWIRABLE OR H.R.C.**

**10—15—30 Amp. Switches
10—15—30—60 Amp. Switchfuses.**

Modern styling, sound technical performance and compliance with all relevant British Standard Specifications are basic essentials. The range complies with the most strict interpretation of I.E.E. Regulations (13th edition), and with the requirements of The Electricity (Factories Act) Special Regulations.

Features Include

Cases of one piece pressed steel with hinged covers, rustproofed and finished light grey stove enamel.

Front operating switch handles improve appearance and permit more compact assemblies on switchboard and panels.

Fuses are of the new “Kantark-Exel” pattern which will accept rewirable or H.R.C. fuses.

Semi-enclosed rewirable (damper type) patterns comply with B.S.3036 : 1958.

M.E.M. H.R.C. cartridge fuse carriers are designed to accommodate H.R.C. cartridge fuse-links made to B.S.88 : 1952, Appendix ‘J’ Dimensions, Form A—Offset Tags.

M.E.M. H.R.C. cartridge fuse-links have been A.S.T.A. certified for categories of Duty 440 A.C.3 (16,500 amps.), 440 A.C.4 (33,000 amps.) and 440 A.C.5 (46,000 amps.).

WRITE FOR LIST 447R



“Memrex Exel” switches comply with the relevant Temperature Rise and Making and Breaking Capacity Tests of B.S.861 : 1955 and switchfuses with B.S.2510 : 1954.

All these and many other features.



STANTON

PRESTRESSED SPUN CONCRETE LIGHTING COLUMNS

Photograph showing Stanton Type 8G Spun Concrete Lighting Columns fitted with G.E.C. Z.9454 Sodium Lanthorns at Epsom, by courtesy of C. G. Cobbett, Esq., A.M.I.C.E., M.I.Mun.E., Borough Engineer and Surveyor.

The above type is one of many Stanton designs approved by the Council of Industrial Design and acceptable to the Ministry of Transport for use on trunk roads.

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

2925
21-3

AVO INSTRUMENTS

Made within the shadow of Big Ben, AVO instruments enjoy a reputation for reliability which, like the chimes of this famous Tower, reaches the farthest corners of the world.



Regd. Trade Mark

D.C. Amplifiers
Radiation Monitors
Valve Voltmeters
Multi-range Testmeters
Valve Testers
and other electronic
and nucleonic instruments

AVO LTD

AVOCET HOUSE · 92-96 VAUXHALL BRIDGE ROAD · LONDON · S.W.1

Telephone: VICtoria 3404 (12 lines)

Cables: Avocet, Sowest, London

A MEMBER OF THE METAL INDUSTRIES GROUP OF COMPANIES

G23

GLAND PACKING GONE FOR GOOD...

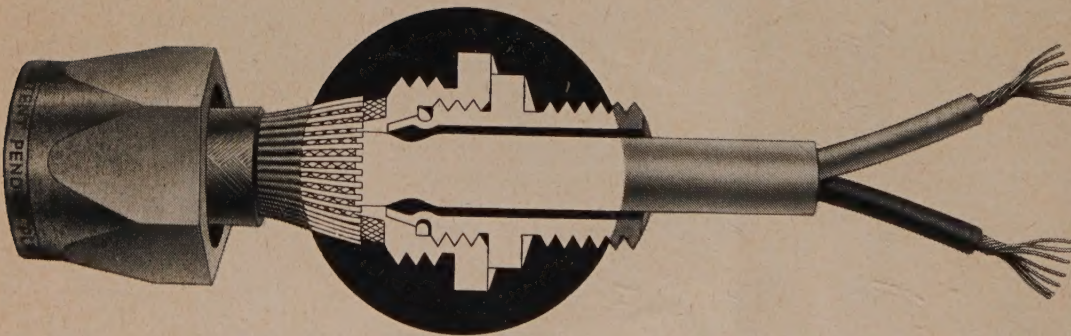
Our new, crimped-on

glands are absolutely self-sealing!

A unique fused-in lead lining crimps the cable as the component parts of the gland are assembled to form a joint that is perfectly watertight!

Because of this—plus the ease of assembly—our glands are matchless in price and performance.

The PLA Gland for Armoured Cable and the PL for Unarmoured, provide 200 lb. per sq. inch water-pressure-tight seal and perfect earth-bonding without any form of packing. Approved for use with Flameproof Certified Equipment in Hazard Groups 2 and 30.



Actual size of $\frac{3}{4}$ " gland

WHATEVER YOUR CABLE WE HAVE THE GLAND

This illustrated brochure details our complete range of glands with performance figures of our PL, PLA, ARM, BWT, PIL and PILA plus the newly-designed ARM moisture-proof. Please send for a copy.

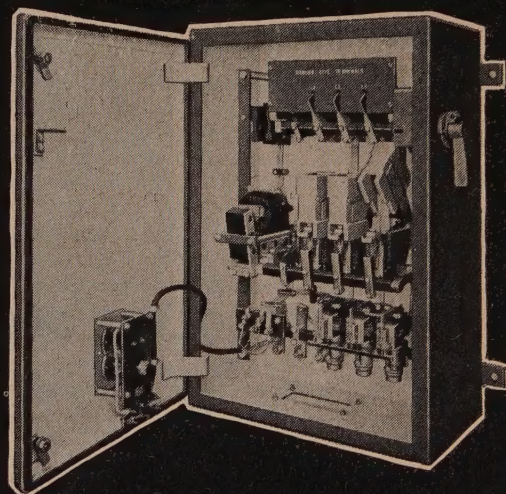
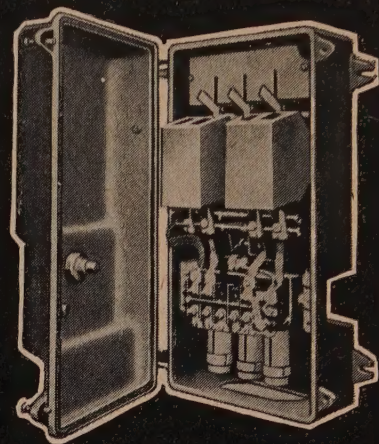
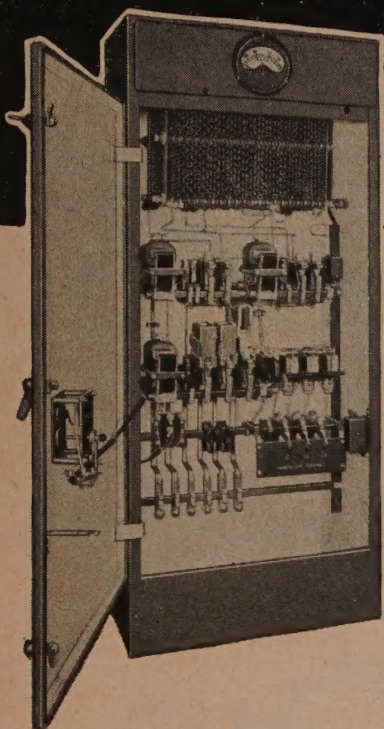
Combination Metallic Packing Co. (1921) Ltd.



Glasshouse Street, St. Peter's, NEWCASTLE UPON TYNE 6 Telegrams: BEL, NEWCASTLE Telephone 65-9091 (6 lines) and 65-9015

"ERSKINE HEAP"

CONTACTOR STARTERS



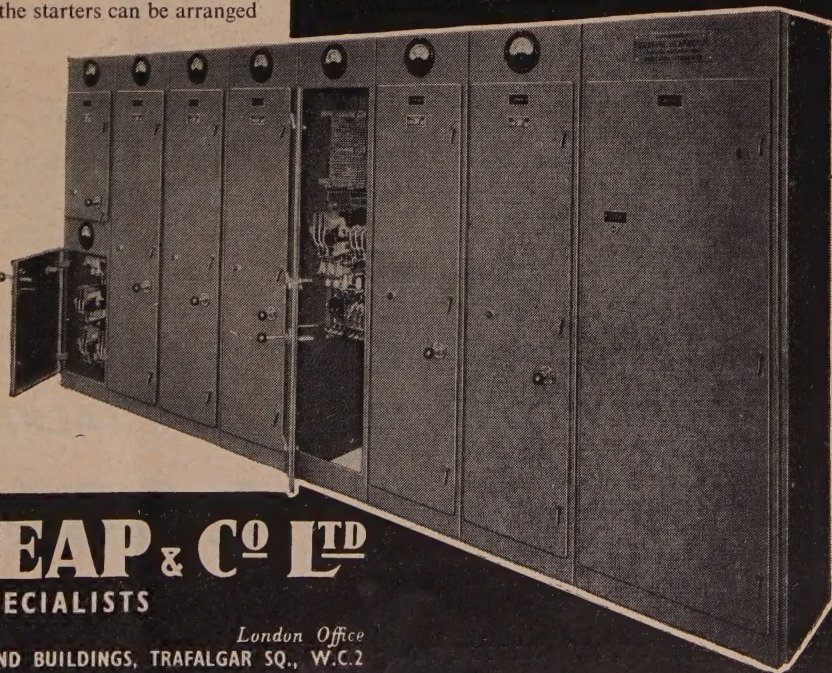
We manufacture contactor starters of the direct-on, star delta or auto-transformer pattern for controlling squirrel cage motors, and of the stator and rotor pattern for controlling slip ring motors.

All overloads are of the accurate solenoid type, and above 10 H.P., powerful magnetic blowouts are incorporated. The contactors are mounted on bakelised steel bars and constitute a completely independent unit ready to be mounted in any frame, case or cubicle, and for any combination of equipment.

All contactors can be supplied either with or without fully interlocked isolating switch. All accessories such as 'hand' 'off' 'auto' switches, control circuit fuses and instruments can be mounted as required, and the starters can be arranged suitable for 'local' or 'remote' control or to be operated by float switches, pressure gauges, thermostats, etc.

WE ALSO MANUFACTURE ALL TYPES OF HAND-OPERATED AIR-BREAK & OIL-IMMERSED STARTERS AND MOTOR CONTROL GEAR

The multi-motor panel type Switchboard illustrated (right) is one of many supplied to one of the leading petroleum companies.



ERSKINE, HEAP & CO LTD

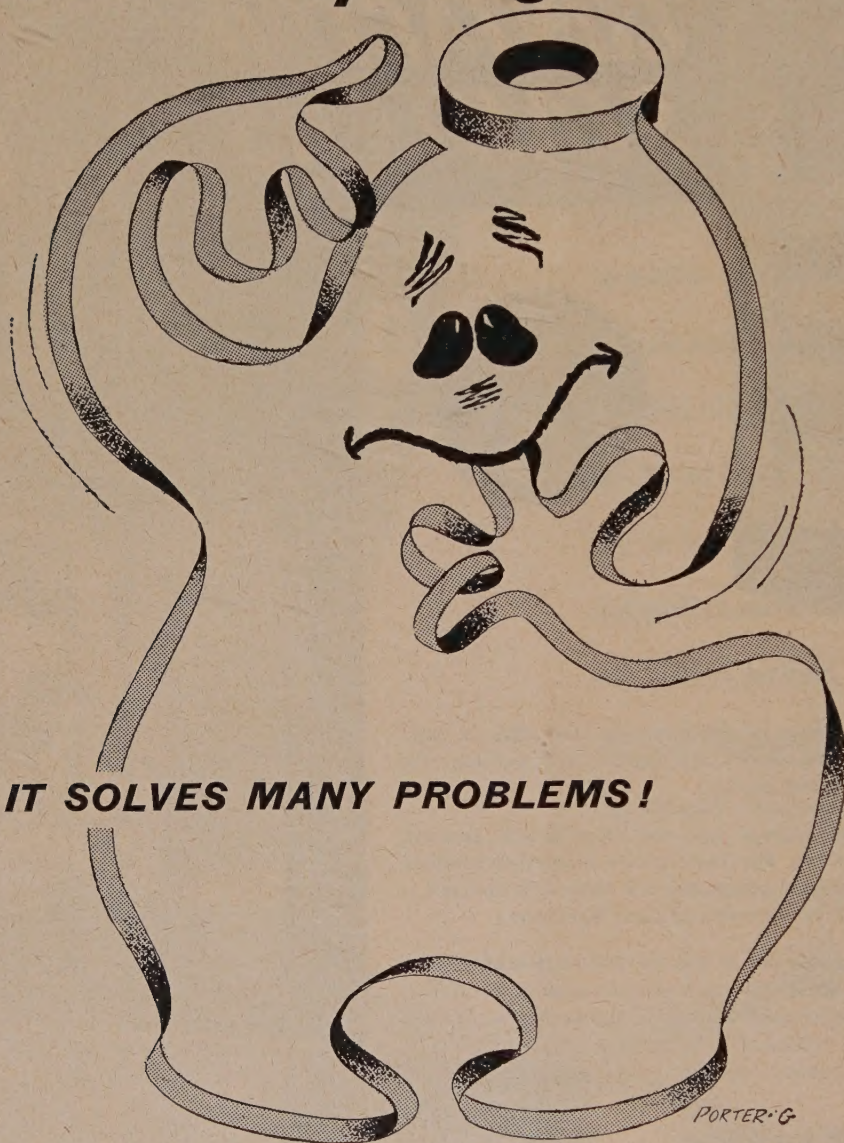
SWITCHGEAR SPECIALISTS

Head Office & Works
BROUGHTON, MANCHESTER (7)

London Office
GRAND BUILDINGS, TRAFALGAR SQ., W.C.2

BRANCH OFFICES AND AGENCIES IN ALL PARTS OF THE WORLD

LASSO No. 92 PVC Electrical Tape can do everything but think —



YET IT SOLVES MANY PROBLEMS!



Lasso No. 92 has so many properties, so many uses, we could fill this page with them. And dull reading it would make. A lot of stuff about pliability, water resistance, acid resistance, wrapping, jointing, insulating, binding, splicing — *that* sort of thing. Far better send for our alert young representative, *he* makes it sound interesting. Ask your secretary to drop us a line today.

SEND TODAY FOR OUR WALKIN', TALKIN', THINKIN' REP

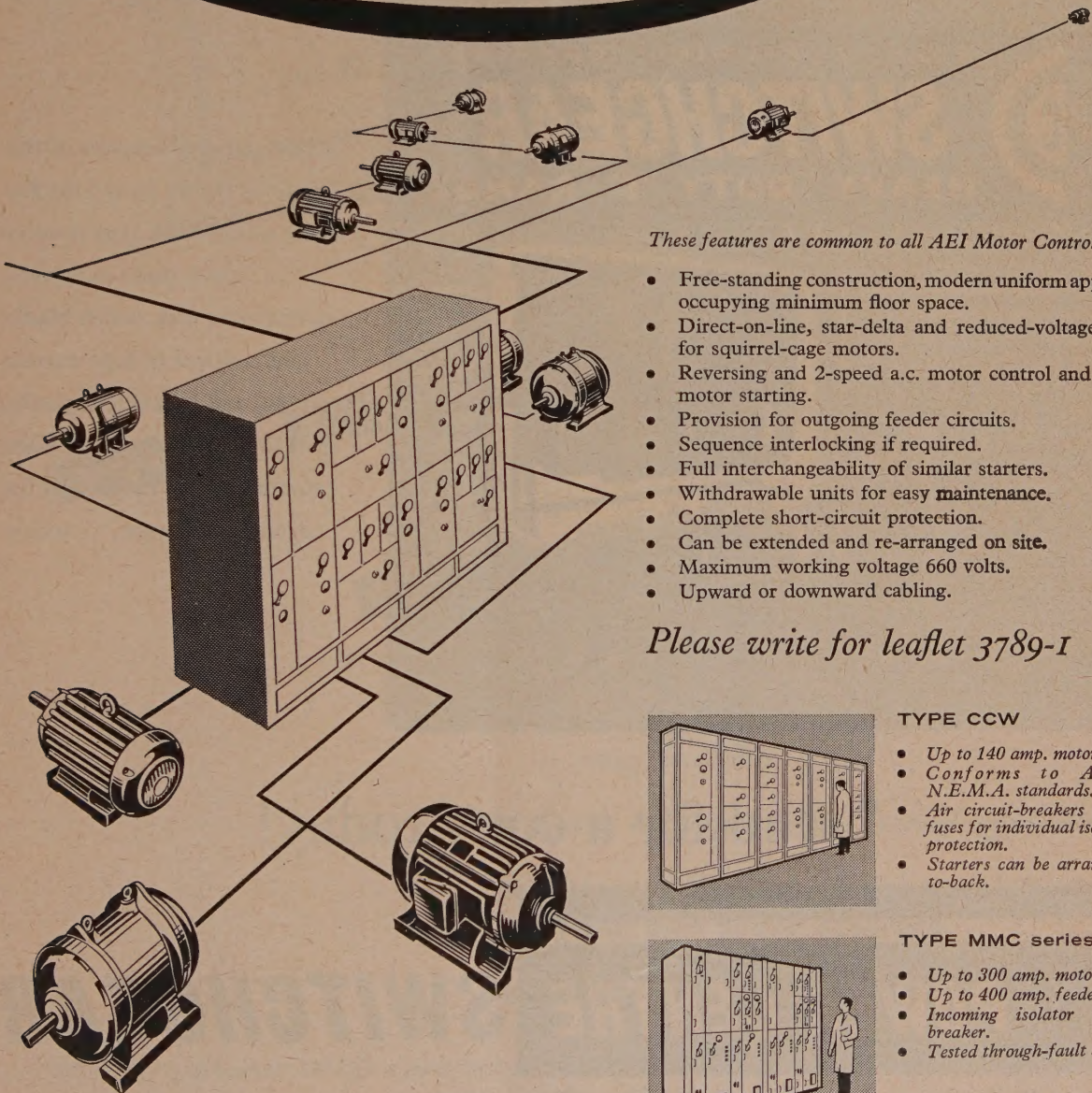
LASSOTAPES

for all electrical and industrial uses

SMITH & NEPHEW LIMITED • WELWYN GARDEN CITY • HERTFORDSHIRE



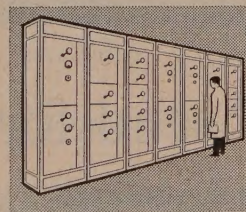
So many advantages with AEI Multi-motor control



These features are common to all AEI Motor Control Centres:

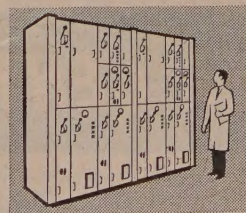
- Free-standing construction, modern uniform appearance, occupying minimum floor space.
- Direct-on-line, star-delta and reduced-voltage starting for squirrel-cage motors.
- Reversing and 2-speed a.c. motor control and slip-ring motor starting.
- Provision for outgoing feeder circuits.
- Sequence interlocking if required.
- Full interchangeability of similar starters.
- Withdrawable units for easy **maintenance**.
- Complete short-circuit protection.
- Can be extended and re-arranged **on site**.
- Maximum working voltage 660 volts.
- Upward or downward cabling.

Please write for leaflet 3789-1



TYPE CCW

- Up to 140 amp. motor circuits.
- Conforms to American N.E.M.A. standards.
- Air circuit-breakers or switch-fuses for individual isolation and protection.
- Starters can be arranged back-to-back.



TYPE MMC series 1000

- Up to 300 amp. motor circuits.
- Up to 400 amp. feeder circuits.
- Incoming isolator or circuit breaker.
- Tested through-fault capacity.

AEI

Associated Electrical Industries Limited
Motor and Control Gear Division
RUGBY AND MANCHESTER

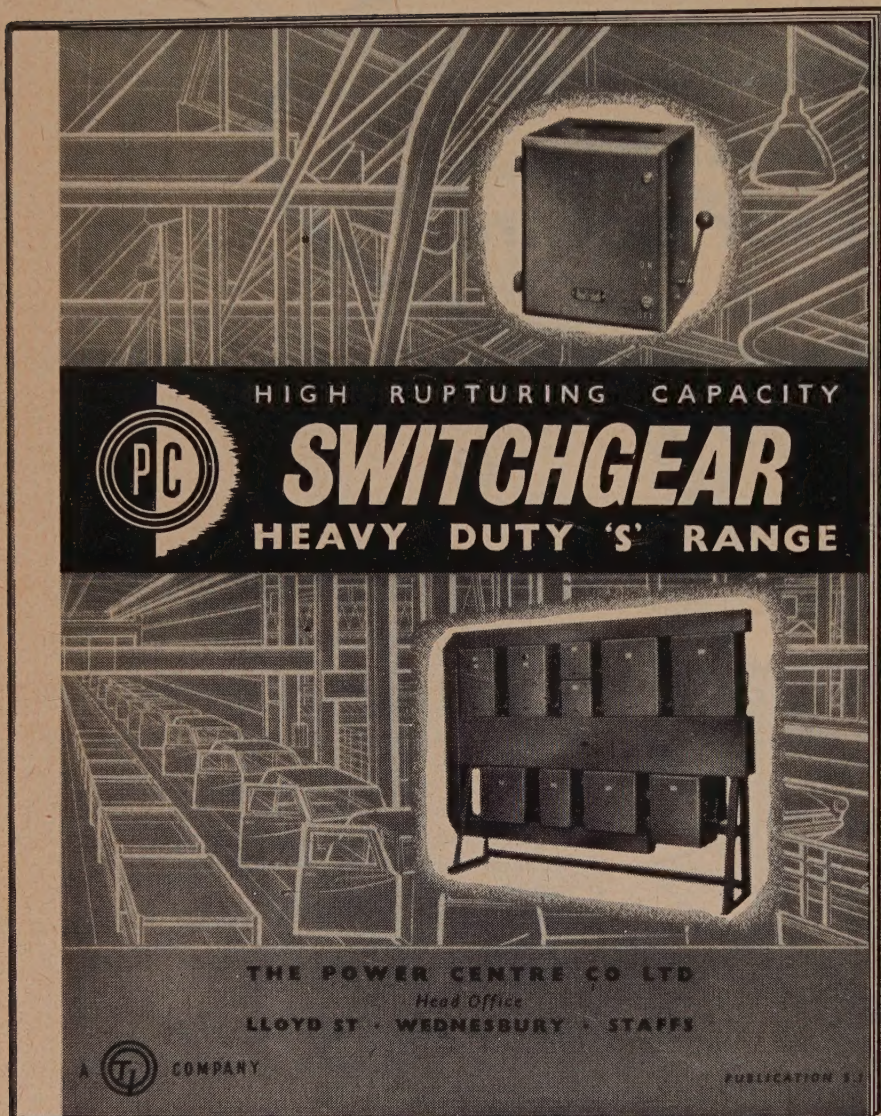
A5530

INCORPORATING THE MOTOR AND CONTROL GEAR INTERESTS OF BTH AND M-V

Gives you full facts



switchgear



HIGH RUPTURING CAPACITY

 **SWITCHGEAR**

HEAVY DUTY 'S' RANGE

THE POWER CENTRE CO LTD
Head Office
LLOYD ST - WEDNESBURY - STAFFS

A  COMPANY

PUBLICATION S.3

Constructional features of this range of Heavy Duty Switches include a Bolt-Lock type positive quick make and break mechanism, with switch blades and contacts of high current carrying and breaking capacity.

For full information on the comprehensive range send for detailed literature . . . today.

*** send for a copy today!**

POWER CENTRE SWITCHGEAR

NEWCASTLE OFFICE:
30 Cloth Market, Newcastle-on-Tyne

Telephone: 24779

LONDON OFFICE:
Wharf Estate, Ealing Road
Alperton, Middlesex
Telephone: WEMbley 8866



THE POWER CENTRE CO. LTD

P.O. BOX 18, LLOYD STREET
WEDNESBURY - STAFFS

Telephone: Wednesbury 1311



FROM THIS CATALOGUE—
you select
FROM STOCK—
we supply

Sturtevant Stock Standard Fans — the finest range available

- *Cover all types of industrial applications*
- *Maintain the best efficiency relating to output and power absorbed*
- *Backed by a full technical advisory service*

Write for publication U2207 which includes comprehensive data and drawings covering speeds, powers, weights and capacities

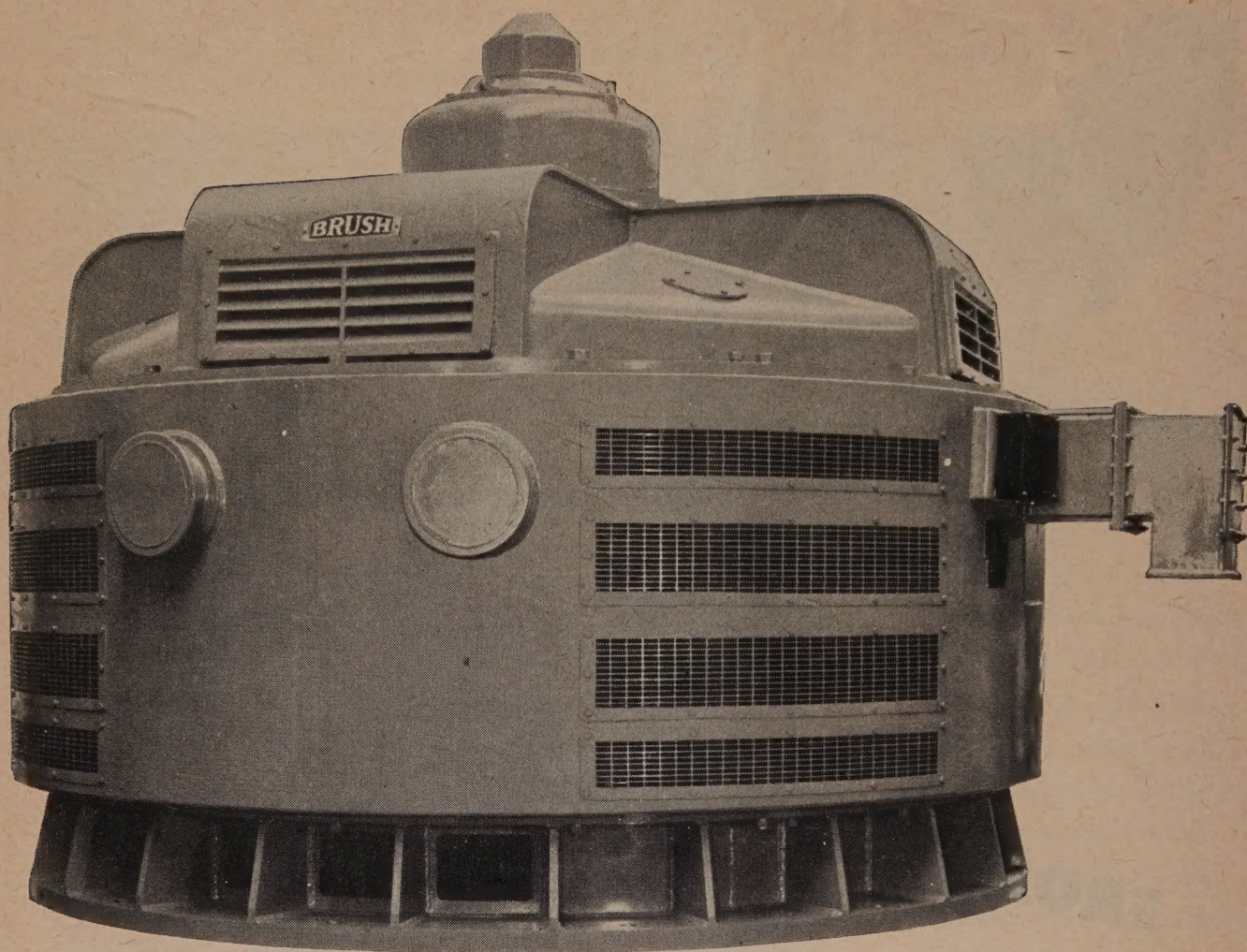
STURTEVANT

ENGINEERING CO. LTD.

Southern House, Cannon Street, LONDON, E. C. 4.

AUSTRALIA: STURTEVANT ENGINEERING CO. (AUSTRALASIA) LTD.

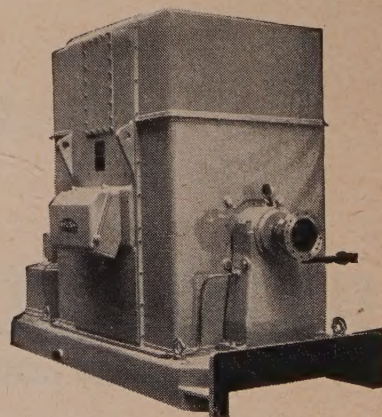
400 SUSSEX STREET SYDNEY N.S.W.



Brush motor designed for pump drive with very heavy down-thrust loading

Exhaustive endurance tests have proved the outstanding reliability of these Brush Water Pump Drive Motors.

For boiler feed and water circulating pumps, I.D. and F.D. fan and other auxiliary driving motors — specify Brush.



Boiler House feed water pump drive motor.



ROTATING MACHINES

For further details apply to:

BRUSH ELECTRICAL ENGINEERING CO. LTD. • LOUGHBOROUGH • ENGLAND



(Member of the Hawker Siddeley Group)



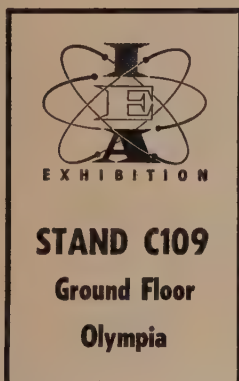
HIGH VOLTAGE, LOW VOLTAGE & RADIO FREQUENCY INSULATORS



STEATITE AND PORCELAIN PRODUCTS LTD

STOURPORT-ON-SEVERN, WORCS. TEL: STOURPORT 2271 GRAMS: STEATAIN, STOURPORT

Why Nalders famous trade mark



75 YEARS AGO, in Westminster, the Nalder brothers employed nine craftsmen in the making of electrical measuring instruments.

By 1887 they had been joined by Mr. C. W. Crawley, the inventor of the Crawley Automatic Cutout, and Mr. Alfred Soames of the Soames Electric Brake.

These three names form the  trade mark that is famous throughout the electrical industry all over the world.

Then in 1896 Mr. Ernest Thompson joined the business and three years later it was incorporated, becoming Nalder Bros. & Thompson Limited.



Nalders have 75 years of experience of making many types of electrical measuring instruments.

They all conform to British Standards Specifications for accuracy.
For quality and finish Nalders set their own unrivalled standard.

Nalder Bros. & Thompson Ltd.

Dalston Lane, London, E.8.

Telephone: **CLIssold 2365**

A Check List of some of Nalders Electrical Products

Ammeters
Voltmeters
Wattmeters

Synchroscopes
Frequency meters
Power Factor meters

Vectormeters
Graphic Recorders
Electrostatic Voltmeters
Phase Sequence Indicators

Miniature Circuit-breakers
Contact-making instruments
Numerous Protective Relays
Earth Proving Supply Switches

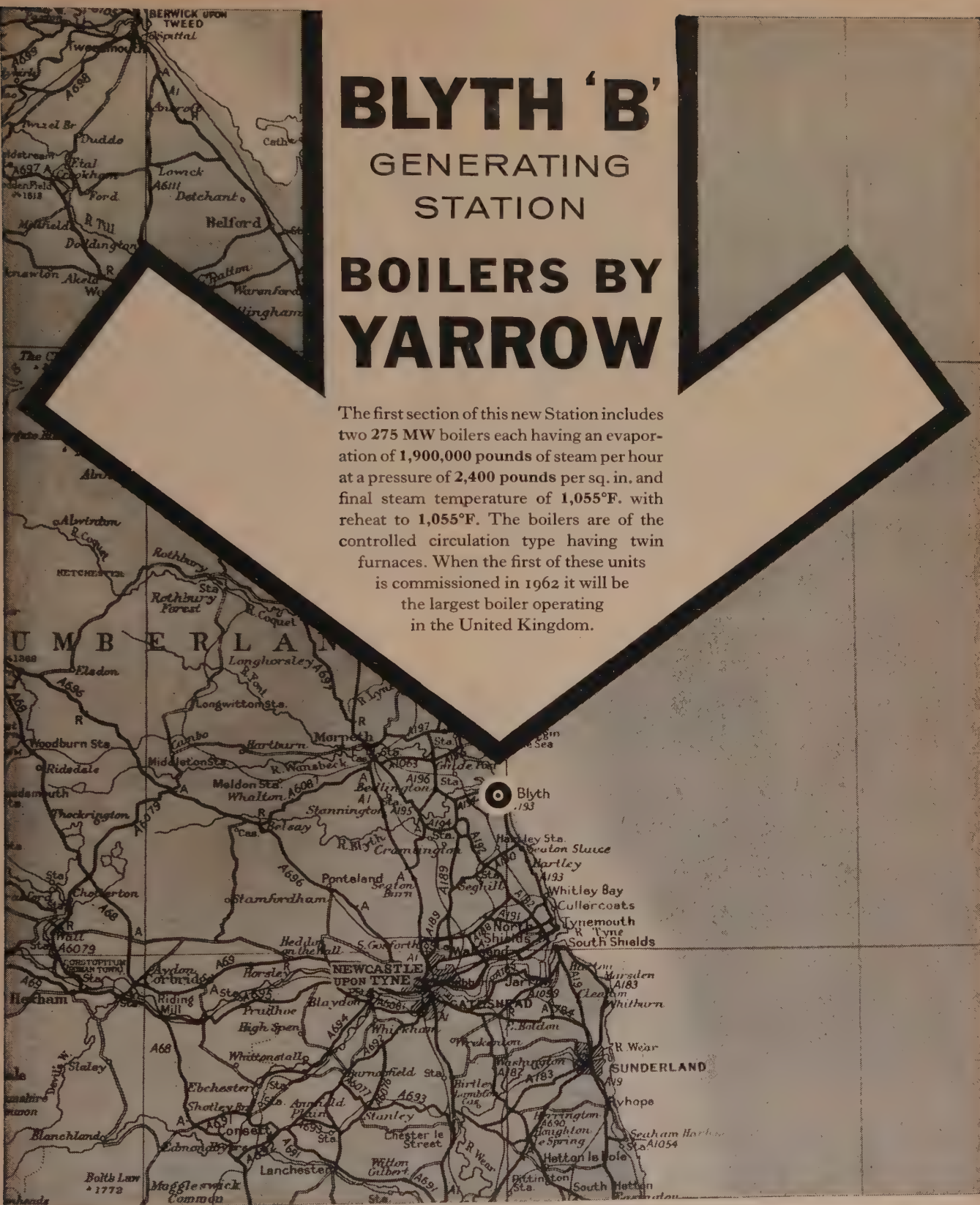
**You may like some illustrated, technical pamphlets for your reference files.
Please write for them, or just telephone CLIssold 2365**

BLYTH 'B'

GENERATING STATION

BOILERS BY YARROW

The first section of this new Station includes two 275 MW boilers each having an evaporation of 1,900,000 pounds of steam per hour at a pressure of 2,400 pounds per sq. in. and final steam temperature of 1,055°F. with reheat to 1,055°F. The boilers are of the controlled circulation type having twin furnaces. When the first of these units is commissioned in 1962 it will be the largest boiler operating in the United Kingdom.



YARROW

YARROW & COMPANY LIMITED · SCOTSTOUN · GLASGOW · W.4

ANNOUNCING!

NEW REDUCED PRICES!

Mazda COILED-COIL the high efficiency lamp

MORE LIGHT - BETTER VALUE

CLEAR AND PEARL

WATTS	40 & 60	75	100
List Price	1/2½	1/10	1/5
Purchase Tax	2½	4	3
Total	1/5	2/2	1/8



MELTON ROAD,
LEICESTER

PREFORMED TECHNICAL BULLETIN No. 2

Preformed

GUY-GRIPS

are applied very quickly by hand
NO TOOLS REQUIRED

The **Preformed** principle combines maximum holding power with low localised pressure and eliminates fatigue arising from stress concentrations.

PREFORMED Guy-Grips are dead ends applied to stays. They are designed to hold the Ultimate Breaking Strength of all stay wires up to and including 70-ton quality, and may be used with stay insulators of all the standard types. Guy-Grip dead ends do not slip and are stronger than the stay wires they are designed to hold.

As the strands of Guy-Grip dead ends are galvanised to the same standard as that normally used for stay strand, no special question of corrosion arises and the Guy-Grips will have at least the same life as the stay strand. The galvanised skin is at no time damaged by tools during manufacture or erection.

As in the case of the normal dead end, the open configuration of the loop gives a cushion effect to impact loads.

Guy-Grip dead ends should be used with a fitting or thimble of reasonably large radius. They are quickly applied without tools.

Guy-Grip dead ends can be applied and removed at least four times without losing the gripping power equal to the Rated Breaking Load of the stay strand. Adjustment of a stay is therefore a matter of releasing the load from the grip and resetting it as necessary. The need for a turnbuckle or other stay adjustment device on the stay rod is thus eliminated. If, during the life of the stay more than four adjustments are required, it is advisable to apply a small quantity of the P.L.P. gripping compound.

PREFORMED Line Products also manufacture:

Armour Rods—for vibration troubles

Line Guards—for conductor protection at insulators

Line Splices—full tension joints

Patch Rods—for repair of individual strand

Dead Ends—full tension clamps

Armour Grip Suspension Units—a revolutionary suspension clamp

Splice Shunts—for overheating joints

Bundled Conductor Spacer Units—the best twin conductor spacer

used
the
world
over



BRITISH



Send for technical Brochure available in English, Italian, French, German or Spanish

PREFORMED LINE PRODUCTS

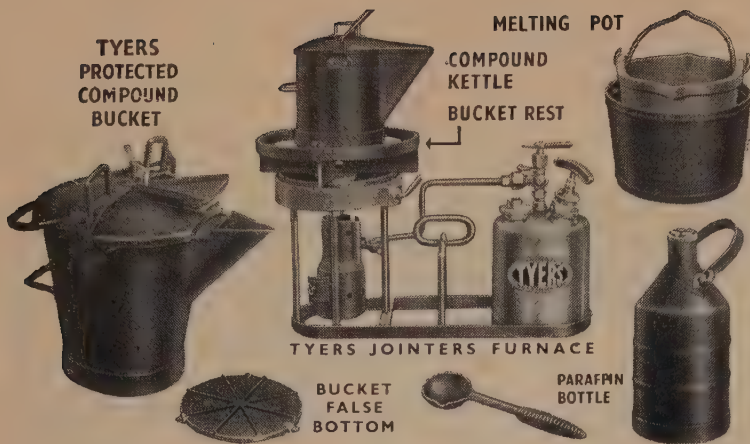
(GREAT BRITAIN) LIMITED

ANDOVER · HAMPSHIRE · ENGLAND

Telephone: ANDOVER 4045

MANUFACTURED UNDER LICENCE FROM PREFORMED LINE PRODUCTS CO. CLEVELAND, OHIO, USA

AP18



TYERS JOINTERS EQUIPMENT

for Dependability

The only choice in 1885...
Still the BEST today!

PORTABLE FURNACE AND PATENTS CO.
CARRINGTON NOTTINGHAM
Telephone 64887 Telegrams 'FURNACE NOTTINGHAM'

BATTERY CHARGERS

HEAYBERD Battery Chargers, incorporating metal rectifiers, embody the results of more than 25 years' experimental work and the understanding of customers' special requirements.

List No. 1048 describes over thirty different types of Battery Chargers.

Write for your copy today.



Model 67

Charges three to thirty-six 2-volt cells at one to eight amperes

F. C. HEAYBERD & CO. LTD

Head Office: GREENWICH SOUTH STREET, S.E.10

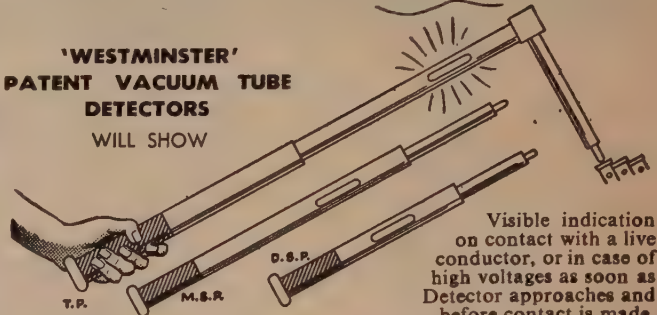
Works: Greenwich.

TIDeway 4646

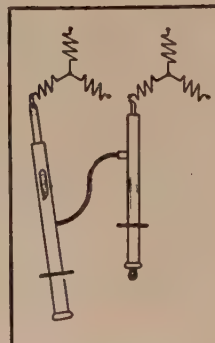
Cables and Telegrams: "Heayberd, Green, London"

Is It Alive?

'WESTMINSTER'
PATENT VACUUM TUBE
DETECTORS
WILL SHOW



Range 2,000 to 35,000 V.



'WESTMINSTER'
PHASING RODS

To locate interconnections between two A.C. systems.

'PARTRIDGE'
PRESSURE DETECTORS

Give visible and audible indication of whether lines and contacts of draw-out switchgear are alive or dead.

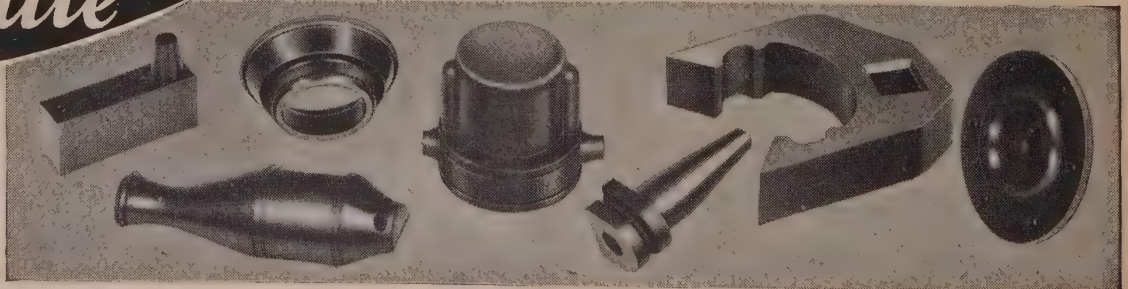
NO EARTH CONNECTION REQUIRED

Write for full details to sole manufacturers:

The WESTMINSTER ENGINEERING Co. Ltd
(Dept. H.1) Victoria Road, Willesden Junction, London N.W.10
Tel.: ELGar 7372 (2 lines)

Dainite

SPECIALISTS
IN RUBBER
MOULDINGS
FOR OVER
60 YEARS



THE HARBORO' RUBBER CO. LTD., MARKET HARBOROUGH. TEL: 2274/5/6.

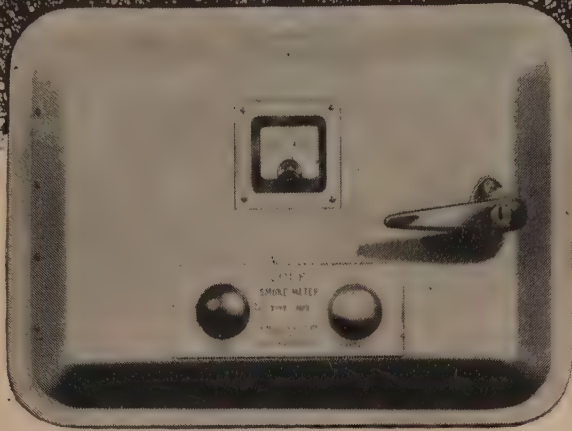


SLIP-RING MOTORS up to 1000 H.P.

GUARANTEED FOR EVER

AGENTS AND BRANCHES COVER THE WORLD

MEET THE REQUIREMENTS OF THE CLEAN AIR ACT



Lock

SMOKE METER & ALARM WILL WARN YOU

Simple to install, it gives continuous record of smoke density, sounding alarm automatically if smoke becomes excessive.

ASK FOR LITERATURE.

A. M. LOCK & CO., LIMITED

ELECTRONIC ENGINEERS

PRUDENTIAL BUILDINGS, 79 UNION STREET, OLDHAM, LANCASHIRE

Telephone: MAIn 6744

CW 4917

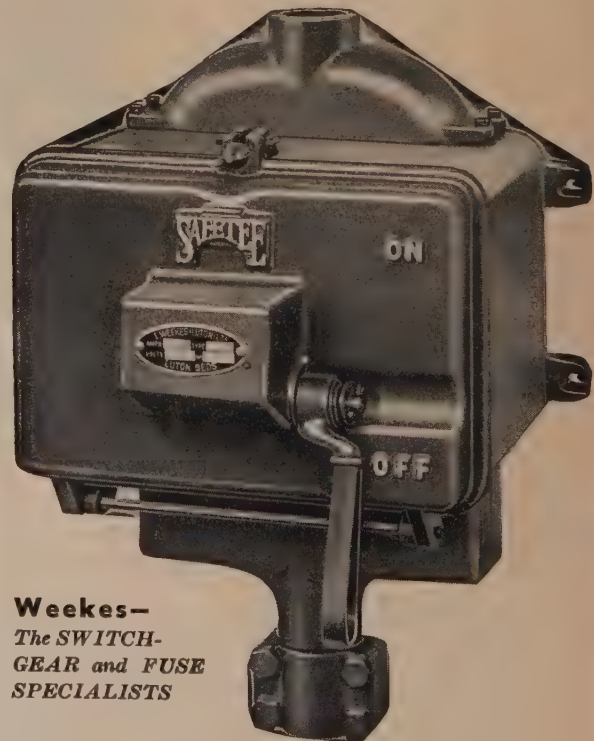
Weekes

'SAFETEE' combined switchfuse with interlocked plug

- ★ Standard rating up to 500 amps, 500 volts A.C. or D.C.
- ★ Totally enclosed, watertight or weatherproof to order.
- ★ Quick break.
- ★ Fully interlocked.
- ★ Cartridge Fuses.
- ★ Cable entries as required.

Full details on request from:

L. WEEKES (LUTON) LIMITED



Weekes—
The SWITCH-
GEAR and FUSE
SPECIALISTS

WINGATE ROAD • LUTON • BEDS

Tel. LUTON 51478

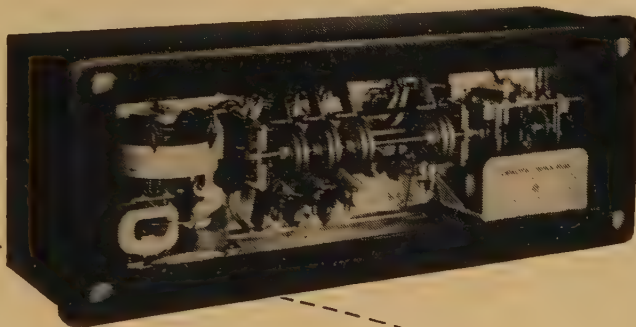
Grams: "SAFETEE, LUTON"

Choose AEI relays
and correct Power Factor
AUTOMATICALLY



Type NJO4 relay for the control of single-step power capacitors.

A complete range of Metrovick relays is available for the control of capacitors as a means of improving the power-factor of industrial loads. Please write for full details.



Type NJO3 relay for the control of a number of capacitors or capacitor sections in sequence. It may be switch-board or wall-mounting pattern with or without control switches.



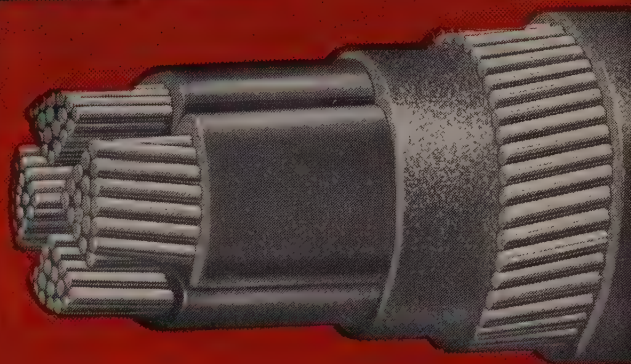
Associated Electrical Industries Limited
INSTRUMENTATION DIVISION - Instrument & Meter Department
Trafford Park, Manchester 17

60 YEARS OF PROGRESS...

P.V.C. INSULATED POWER CABLES

Available for the same conductor range as for Paper Insulated Cables, to B.S. 480/1954, for voltages up to and including 3.3 Kv.

Send for publication No. B16

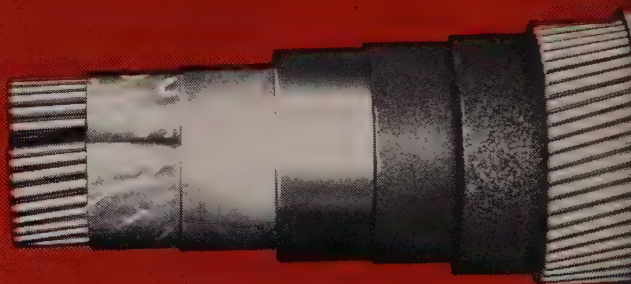


CONNOLLYS

PAPER INSULATED POWER CABLES

Standard range covers 1,100 volts to 11,000 volts with full range of armouring and overall protection with bituminous textiles or P.V.C.

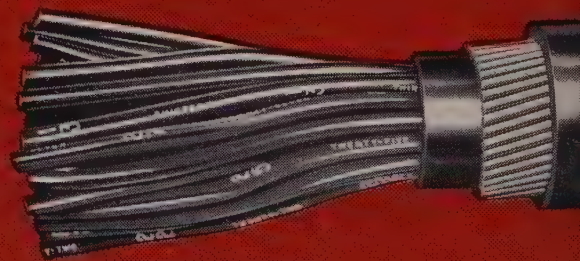
Further details on request.



PILOT AND CONTROL CABLES

A range of power and control cables is available at voltages up to 1,100. To facilitate identification, the P.V.C. insulated cores are clearly printed at frequent intervals with the appropriate legend and numerals. The laid up cores are sheathed with P.V.C. and can be armoured and P.V.C. protected if required.

Further details on request.



TELECOMMUNICATION CABLES

Connollys plastic insulated and sheathed cables are servicing telephone administrations throughout the world. Cables can be armoured with protected galvanised steel if there is a danger of mechanical damage, or they can be supplied with inbuilt catenary for overhead suspension. All cables are suitable for installation in tropical conditions.

*Send for publication B.11A (Polythene Insulated)
and publication B.14A (P.V.C. Insulated)*

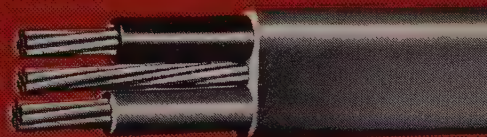


FOR CABLES

WIRING SYSTEM CABLES

Connollys stock a wide range of plastic insulated and sheathed cables in accordance with B.S. 1557/1954 (Polythene insulated, P.V.C. sheathed) and B.S. 2004/1955 (P.V.C. insulated, P.V.C. sheathed).

Further details on request.



'BLACKLEY' INSULATING TAPE

'Blackley' Tape has been produced by Connollys since 1895 and its adhesive and insulating properties are appreciated throughout industry. The adhesive surfaces never 'strip' because the rubber compound is frictioned on to both sides of specially woven cloth. Available in widths $\frac{1}{2}$ " to 2" in 5, 10, 25 and 50 yard rolls.

Send for publication No. B.12.

**BICC
GROUP**

HOME BRANCH OFFICES AND STORES

LONDON: 23 Starcross St. N.W.1. Tel: Euston 6122

BIRMINGHAM: 39-44 Watery Lane, Bordesley 9
Tel: Victoria 4991-2, Telex: 33-309

GLASGOW: 73 Robertson St. C.2. Tel: Central 3862

NEWCASTLE-UPON-TYNE, 1: 6 Baltic Chambers, Quayside
Tel: Ponteland 3128

LEIGHTON BUZZARD: Vimsey Drive, Tel: 3470

ABLE DIVISION

CONNOLLYS (BLACKLEY) LIMITED

HEAD OFFICE AND WORKS MANCHESTER 9

Tel: CHEETHAM HILL 1801 Grams: CONNOLLYS BLACKLEY

In the power cable field, too, a new cable drum symbolises the combined resources of Henley's, Liverpool Cables and Siemens Ediswan. For super-tension cables to the highest voltages or low tension paper or plastic insulated mains cables, AEI leadership is unsurpassed. You can rely on AEI.

AEI

A NEW SYMBOL FOR POWER...

AEI CABLE DIVISION
 Associated Electrical Industries Ltd
 51-53 Hatton Garden, London, E.C.1
 Phone: CHAncery 6822



NEVER FORGET

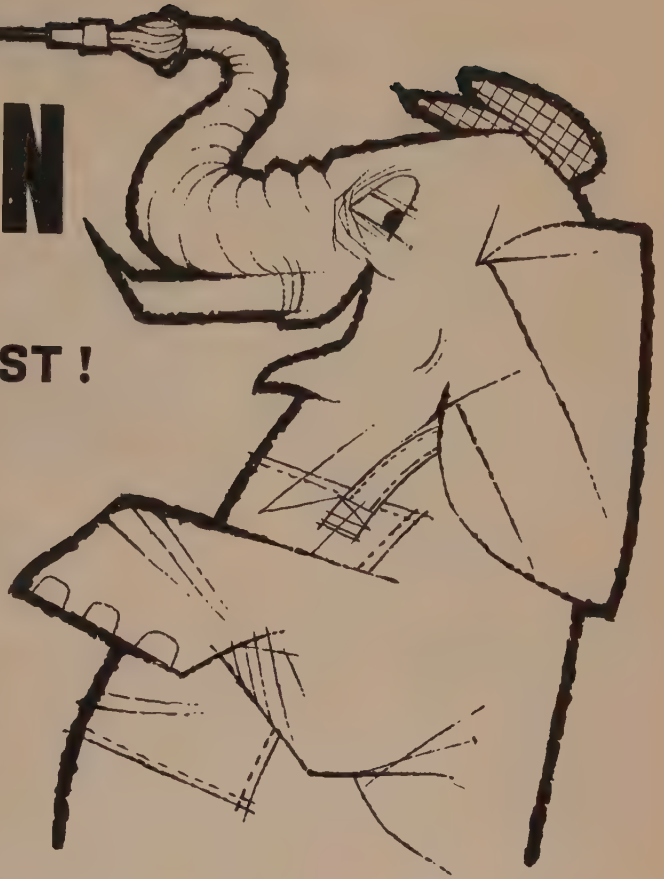
WOOTTON

METER BOARDS ARE BEST!

Here's a trunk call coming through for all meter board users: "Wootton tested boards are extra tough, and combine strength plus reliability under all climatic conditions"—and don't forget WOOTTON wood blocks, sunk switch boxes and instrument cases

WOOTTON & CO. LTD.**ALMA WORKS, PONDER'S END, MIDDX.**

Telephone: HOWard 1858



Variac

Regd. Trademark

WITH Duratrak[★]

THE MOST USEFUL DEVICE KNOWN FOR THE CONTROL OF AC VOLTAGE

VARIAC is the original continuously-adjustable auto-transformer, providing a smoothly variable output from zero to line voltage and above.

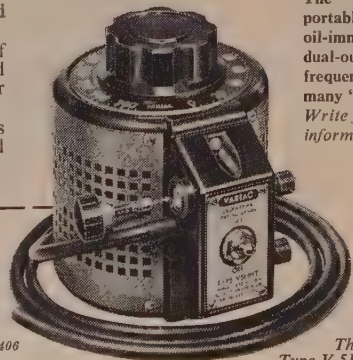
VARIACS are available in a very wide range of models from small units for laboratory and instrument use to large ganged assemblies for three-phase power.

VARIACS are available open or covered, as single units or ganged assemblies, for manual operation or motor-driven.

★ Duratrak? Duratrak (Regd. Trademark) —a patented* feature exclusive to Variac—is a special plated contact surface giving longer life, increased overload and surge capacity and maximum economy in maintenance. Duratrak is now standard on all models except Series 50.

*U.K. Pat. No. 693496

ONLY VARIAC HAS DURATRAK



The range includes portable, metalclad and oil-immersed models, dual-output types, high-frequency types and many 'specials'.

Write for complete information.

This small Variac, Type V-5HMTF, provides an output of 0-270 V, 2 A, from 240 V 50 c/s mains. A still smaller model, Type V-3H is rated at 1 A.



Claude Lyons Ltd.

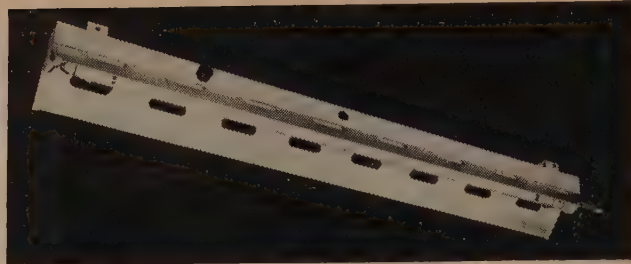
This 3-gang assembly, Type 50-BMG3, will control 22.5kVA, 3-phase or single-phase according to connection. Larger assemblies can be made.

VALLEY WORKS · HODDESDON · HERTS · TELEPHONE: HODDESDON 4541 (6 LINES)

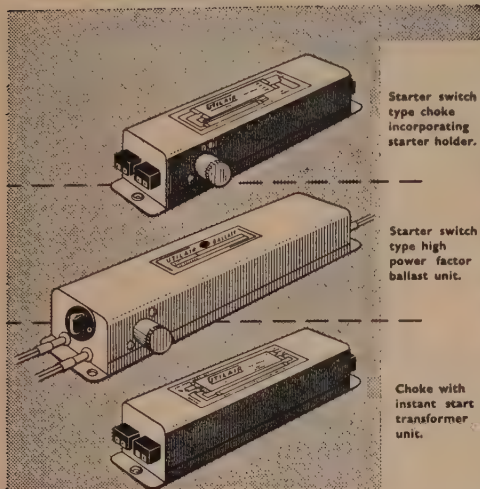
CL59/2A

**BRITAIN'S BEST
FLUORESCENT LIGHTING
FITTINGS & CONTROL GEAR**

UTILAIR



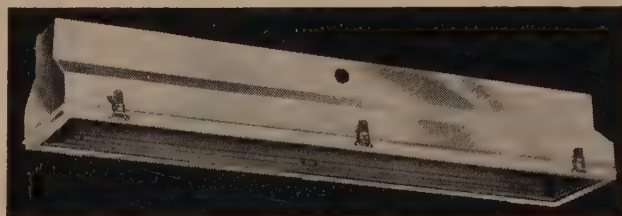
Model SSV.80 Industrial metal trough—slotted top



Starter switch
type choke
incorporating
starter holder.

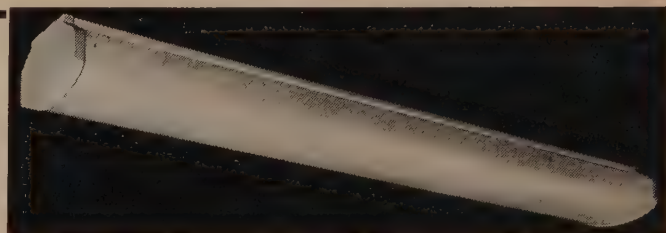
Starter switch
type high
power factor
ballast unit.

Choke with
instant start
transformer
unit.



Model VP.802 Industrial vapour-proof totally enclosed fitting

**Britain's best range
of Fluorescent Fittings
selected for
efficient lighting by
famous concerns
all over the world**



Model EP.802 Suspended or ceiling fitting with opal fluted "Perspex" diffusing cover

UTILITIES (LONDON) LTD.

Manufacturing Electrical Engineers

TUNSTALL ROAD · BRIXTON

LONDON · S.W.9

Telephone: Brixton 6811-4

Telegrams: Utilon, London, S.W.9

TETRA
**TUBULAR SHEATHED
MINERAL EMBEDDED
ELEMENTS**

Specs Heater Elements

Kettle Elements

Washing Machine Elements

Water Heater Elements

Space Heater Elements

These finned elements can be supplied in lengths up to 12ft.-14ft. and are available in copper, mild or stainless steel and aluminium, straight or bent to requirements.

Tetra elements can be produced to customers' own requirements and to conform with recognised British and Overseas Standards. Technical department available for advice and assistance in design.

★ NEW FLAT CONNECTOR

Specially designed for the highly loaded kettle element.
Conforms to BS.562/10 amps. Samples available on request.

THE TETRA ENGINEERING CO. LTD. TETRA WORKS - NORTH END RD. - WEMBLEY - MIDDLESEX. Tel.: WEMbley 1066 (5 lines)

Ellison latest



HEAVY DUTY FUSE-SWITCHGEAR

Ellison 550 volt Heavy Duty Fuse-switchgear is designed and constructed to meet the modern requirements of consultants, architects and contractors for the distribution of power in factories, offices, public buildings and for similar service. Its standards of reliability and safety, simplified maintenance, modern appearance and good finish are in keeping with the best Ellison tradition. Literature is available but, better still, why not ask for a member of our Technical Staff to call!

COMPLIES WITH B.S.3185 : 1959

MAKING CAPACITY 46,000 amps at 550 volts, .15 power factor.

SWITCH BREAKING CAPACITY

3 times the rating at .25/.3 power factor.

BUSBAR COPPERWORK complies with B.S.159 : 1957.



GEORGE ELLISON
LIMITED

PERRY BARR • BIRMINGHAM 22B

When it's a
question of

**FIRE
ALARMS..**

For Manual Contacts,
Bells and Indicators,
Automatic Detectors,
come to the manufacturers
with sixty years' experience,
trained staff and the most
up-to-date equipment.

In brief

write for
catalogue
to



ASSOCIATED FIRE ALARMS LTD.,
Claremont Road, London, E.17. *Service throughout U.K.*

Branches in Bristol • Birmingham • Edinburgh • Glasgow
Harrogate • Leicester • Liverpool • N. London • S. London
Manchester

TAS/AF.146c

**126 MILLION TIMES
SO FAR WITHOUT ATTENTION**

BLEECO
FLASHERS
FOR ZEBRA
CROSSINGS

ARE AS
DURABLE
AS
ALL THEIR
PRODUCTS

--

LANTERNS
FLOODLIGHTS
BOLLARDS
CONTROL
BOXES



BLEECO LTD *Phone: B/TON 64461*
35 WELLINGTON ROAD BRIGHTON 7

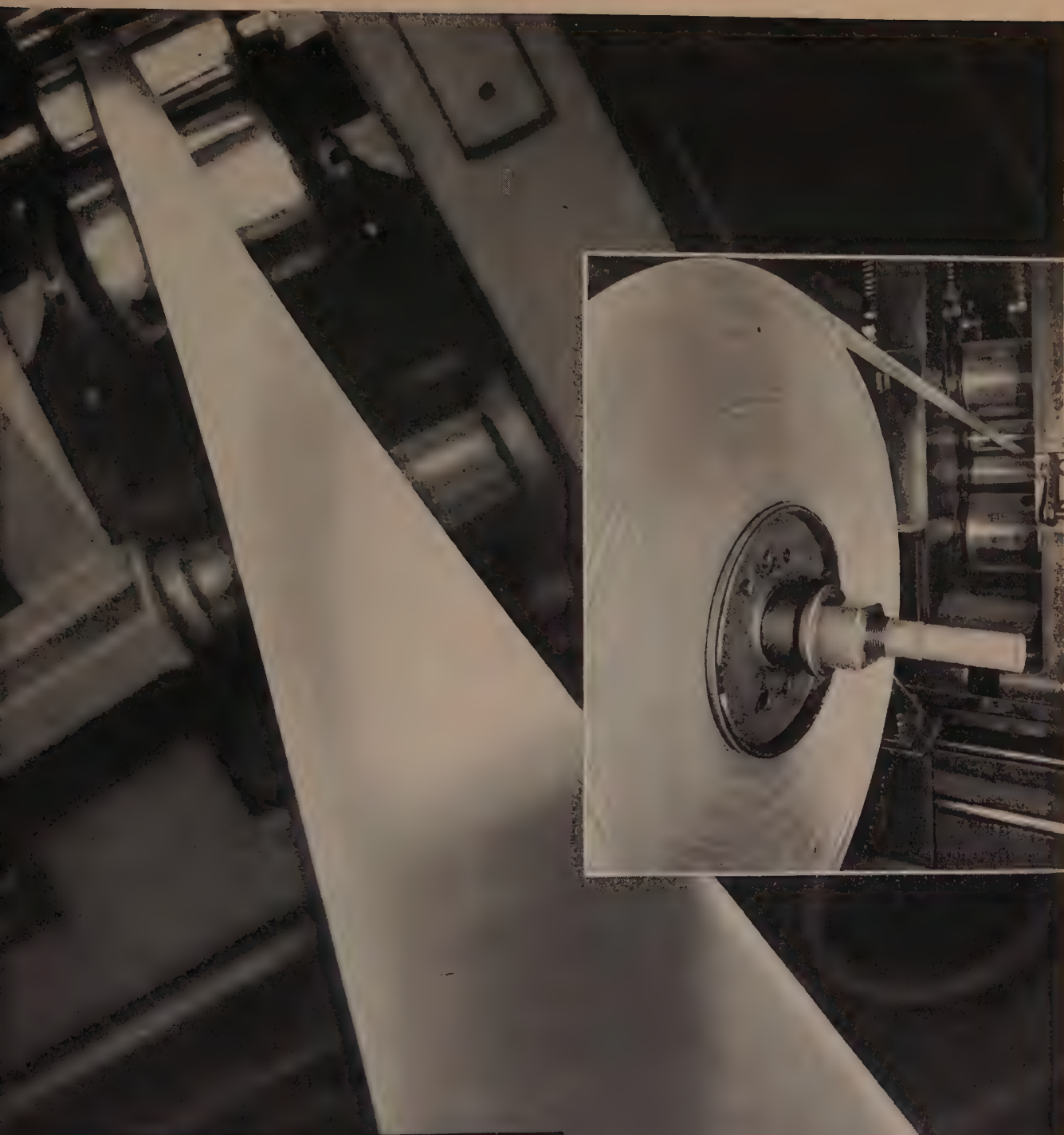
Mercury switches

THE MERCURY SWITCH MANUFACTURING COMPANY LIMITED are the largest specialised manufacturers of Mercury Switches in Great Britain. These are made to exceptionally high and uniform standards of quality.

Since its inception in 1932, this Company has concentrated solely on the production of Mercury Switches. It has thereby obtained the widest possible experience and expert knowledge of design manufacture and application.

**THE MERCURY SWITCH
MANUFACTURING COMPANY LIMITED
WEST DRAYTON + MIDDLESEX**

West Drayton 3157

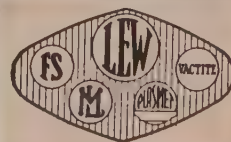


Rolling
ANACOS
RICO

copper strip

soft, medium or hard
drawn, up to 5½" wide

FREDERICK SMITH & COMPANY
ANACONDA WORKS SALFORD LANCs



*Consult***Birch**

REGISTERED TRADE MARK

*for***TOROIDAL RESISTORS**

also makers of:
Asbestos Woven Mats
Heating Elements
Loading Resistors
Motor Operated Resistors
Stud Type Resistors
Sliding Resistors

FORMER : Patented ceramic moulding with horizontally opposed copper graphite internal brush movement.

WINDING : Best quality resistance wires to B.S.S. 115.

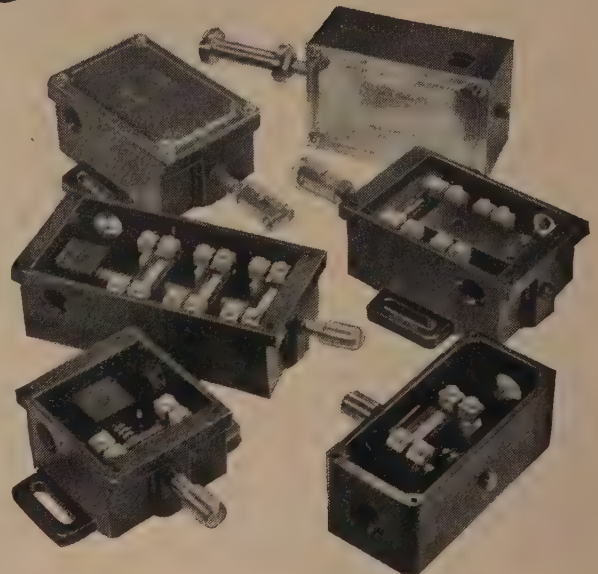
Write for list No. 130

VITREOUS ENAMELLED RESISTORS

Ferrule or wire end type : full range of 24 sizes — $1\frac{1}{2}$ — 250 watts. List VE 190.

**H. A. BIRCH & CO. LTD.****WOOD STREET, WILLENHALL, STAFFORDSHIRE**

Telephone: WILLENHALL 494 · 495 · Grams: WILLOHM WILLENHALL
LONDON OFFICE: HERGA WORKS, WALLINGFORD ROAD, UXBRIDGE
MIDDLESEX. Tel.: Uxbridge 5211

*"Colne"***HEAVY DUTY
LIMIT SWITCHES**

Manufactured by

ASQUITH ELECTRICS (Colne) LTD.

formerly Colne Switchgear (K. & W.) Ltd.

Walton Street, Colne, Lancs.

Telephone: Colne 1394/5

**ENBRAY CONTACTORS
FOR HEATING LOADS**

RECENT CONTRACTS INCLUDE:—

- Contactors for ROAD HEATING
The Mound, Edinburgh.
- For FOOTBALL GROUNDS
Murrayfield, Edinburgh.
- For DOMESTIC SPACE HEATING
300 Houses, S. Scotland.
- And for Night Storage, Metal Pots,
Oil Heating, etc.

*Makers of Quality Control Gear for nearly forty years***E. N. BRAY LTD**

Head Office and Works:

BRITANNIA ROAD, WALTHAM CROSS, HERTS

Telephone: Waltham Cross 22212-5

GLASGOW: Telephone: Douglas 1271

Branches: MANCHESTER: Telephone: Blackfriars 4791

BIRMINGHAM: Telephone: Four Oaks 2185

*Quality***PLASTIC
MOULDINGS***with
Service***Consult SOUPLEX Limited**

WESTGATE · MORECAMBE

PHONE 1717/8

ELECTRO-CERAMICSfor the Electrical and
Allied Trades

GASKELL & GROCOTT LTD.
Whitehall Works, Porthill, Staffs
Telephone: Newcastle (Staffs)
52241-2-3

KEEPING

DANGER

at a distance

That distance, whether it be governed by steel bars or wire mesh, can represent the difference between safety and serious injury. Machinery and tools—often running at high speeds—can be as productive of danger as any wild animal; and it is only good sense to cut this risk by using efficient and properly designed guards and fencing.

'Harco' Machinery Guards are purpose made for every type of machinery, and are constructed to afford complete protection without interfering with efficient operation. They are strongly made from stout wire mesh, and fully conform to Factory Act requirements.

The complete Harvey service covers advice, design and installation, and List No. 996 shows many types already supplied.

**'HARCO'****MACHINERY GUARDS**

Other HARVEY Facilities and Products: PERFORATED METALS • WOVEN WIRE • WIREWORK OF ALL KINDS • GALVANIZING • STEEL SHELVING AND STORAGE BINS • BAR AND TUBE RACKS • FABRICATIONS IN ALL METALS • MACHINING AND FITTING

G. A. HARVEY & CO. (LONDON) LTD., WOOLWICH ROAD, LONDON, S.E.7
Telephone: GREenwich 3232 (22 lines)

ww/2

HARVEY

Transicon

Transistor controlled
alternators with voltage regu-
lation of $\pm 1\frac{1}{2}\%$ as standard
from no load to full load.

Manufactured by the
Macfarlane Engineering Co.
Ltd. Glasgow, patentees and
manufacturers of Magnicon
inherently self regulating
alternators.

**A new word
for your
Electrical
Vocabulary**



*Voltage Regulation of $\pm 1\frac{1}{2}\%$

as standard, without an increase in
frame size.

*Available with conventional brushgear
with outputs 5-600 KVA.

Also as Brushless type alternators,
10-150 KVA.

*You are invited to write for
full technical information.*

THE MACFARLANE ENGINEERING COMPANY LIMITED

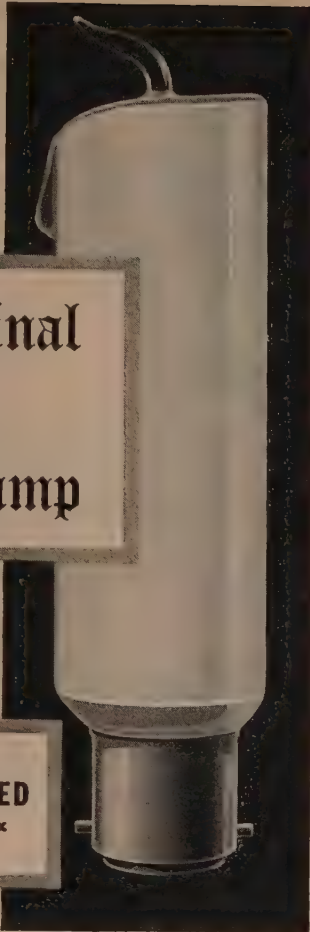
NETHERLEE RD., CATHCART, GLASGOW, S.4

Telephone: MERRylee 2255/7

The Original Artistic Candle Lamp

In addition to a complete range of G.L.S. and modern contemporary lamps we also supply in 25W. and 40W. White or champagne colour glazed, red or green.* Standard Caps B.C. and S.B.C.
*Colour Sprayed.

All enquiries to:
ISMAY LAMPS LIMITED
Roden Street Works, Ilford, Essex
Telephone: ILFORD 1153



Let **METOOL** Cable Collectors



**MOTOR
DRIVEN**

NEATLY 'WIND-UP' YOUR



TRAILER TYPE

POWER PROBLEMS



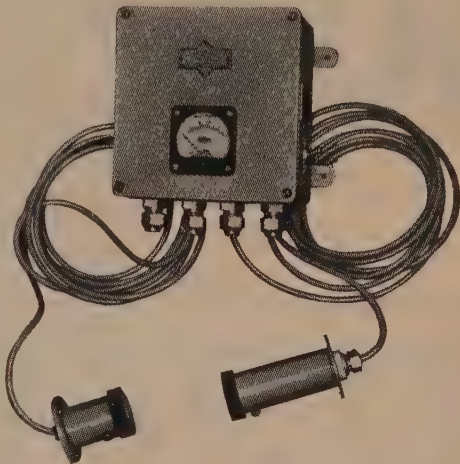
**SPRING
OPERATION**

We solve ALL problems relating
to trailing cables and hose.

METROPOLITAN TOOL & PRODUCTS LTD.
21 VICTORIA STREET, NOTTINGHAM.
PHONE: 51651 GRAMS: METOOL, NOTTINGHAM



Photo-Transistor Equipment

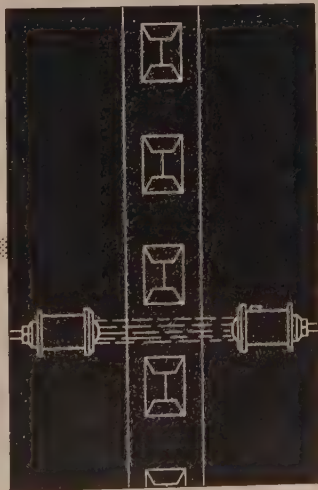


*A low-priced industrial unit for
counting, controlling, protecting*

Using a photo-transistor as light-sensitive device and containing no valves, this new LONDEx equipment is extremely compact, robust and reliable. It comprises simply a projector head, photo-transistor head and a control unit which incorporates the low-voltage supply for the projector. A meter enables correct alignment of the light projector and photo-transistor head to be made with ease.

The two heads are supplied complete with 6 ft. leads. These leads need not be co-axial and can be up to 100 ft. long.

A version is available with built-in 5-figure counter.

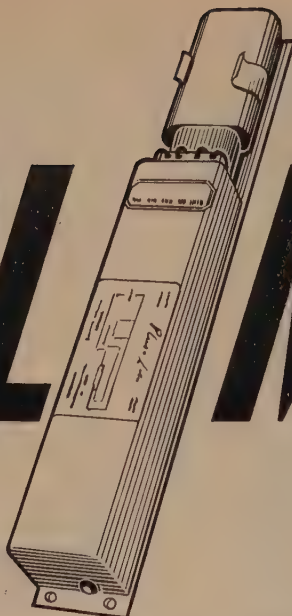


*Illustrated catalogue and price list of photo-electric
equipment gladly sent on request.*

LONDEX LTD.

**ANERLEY WORKS,
LONDON, S.E.20
Tel.: Sydenham 3111**

SO SLIM!



THE NEW ELCORDIA MARK IV

PLUS+LITE

'Slim-type'
fluorescent lighting unit

More compact ★ Longer life ★ No earth strip required ★ Polyester filling for more efficient cooling and quieter operation ★ Unaffected by humidity High power factor ★ First-class materials and workmanship ★ Keenly priced ★ Fully guaranteed ★ Strikes with 15% Voltage reduction.

Dimensions:

Semi-enclosed type: Overall dimensions 17" long x 2" deep x 2½" wide. Fixing centres at 15" and 16½".

Totally-enclosed type: Overall dimensions 15½" long x 2" deep x 2½" wide. Fixing centres 15".

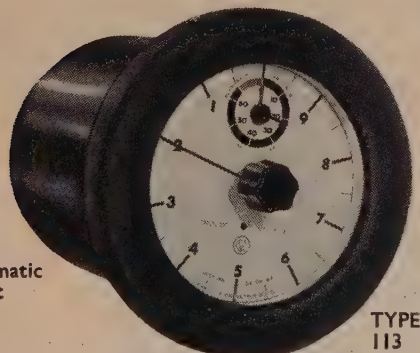
Approved by Ministry of Works.

PRICE 72/6

For full details and discounts, write now to:—

ELCORDIA LTD - MELINGRIFFITH WORKS - WHITCHURCH - CARDIFF

SYNCHRONOUS TIMER



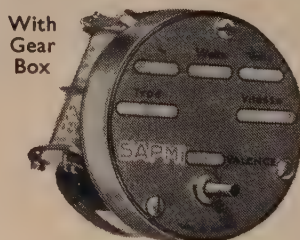
With Automatic Re-set

TYPE 113

Eleven different models are available (½ sec. min. - 26 h max.)

CROUZET

SHADED POLE MOTOR

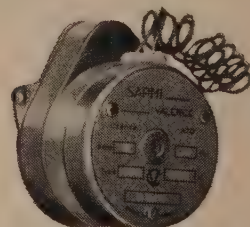


With Gear Box

TYPES 343 and 700

Range of Speeds from 3000 r.p.m. - 1 r/24h.

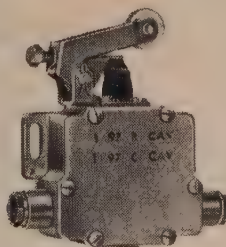
SYNCHRONOUS MOTOR



With Gear Box TYPE 392

High Torque. Range of Speeds 600 r.p.m. - 1r/24h.

LIMIT SWITCH



(Single, two or three pole) Type 621.300.

SEQUENCE CONTROLLER



TYPE 221

1-20 cams, full range of speeds..

IMPULSE SWITCH



(Single, two or three pole) Type 162.100.

TWO POSITION SWITCH



(Single, two or three pole) Type 135.100.

STAND 861 I.E.A. EXHIBITION OLYMPIA



A.F.S. DEVELOPMENTS

9 Church Road, Richmond, Surrey

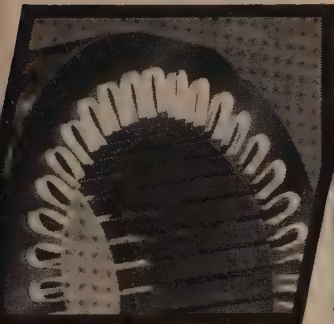
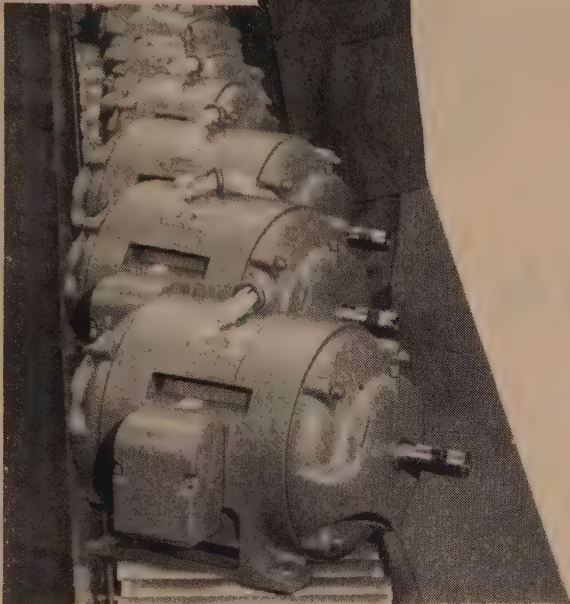
Telephone: RICHmond 6757



Just a line...

Of new electric motors ready to leave one of the three Brook factories.

How much effort has been contributed to give the final result? Many years of experience in selecting the right kind of slot lining; the toughest wire covering for winding coils; experiments to find an effective method of keeping rodents from getting inside, and lastly a simple addition to keep grit and other injurious material from reaching the bearings via the lubricators.



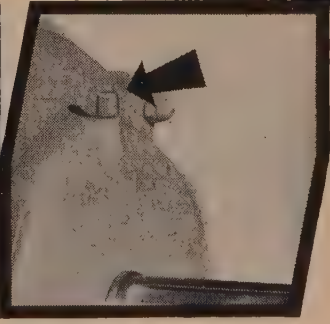
Stout laminate slot linings with Melinex, complying with Class "E" specification.



Tough but pliable wire covering of phenolic resin.



Grids on air deflectors prevent entry of rodents.



Plastic caps on lubricators keep dirt from entering bearings.

All part of Brook desire to give you the best electric motor you can buy.

1/25th. to 600 Horse Power

BROOK

ELECTRIC

MOTORS

"ELMO"

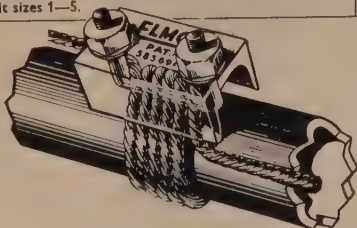
EARTHING CLAMPS

A COMPLETE RANGE TO B.S.951. 1948
IN 4 SIZES

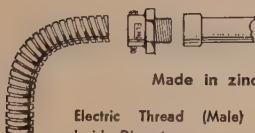
	A123	B45	C67	D8910
for earthing cables up to	7/0.036"	7/0.064"	19/0.064"	19/0.083"
to fit B.S. conduit sizes	1, 2 & 3	4 & 5	6 & 7	8, 9 & 10
i.e. in trade terms	$\frac{1}{2}$ " to $\frac{3}{4}$ "	1" and $1\frac{1}{4}$ "	$1\frac{1}{2}$ " and 2"	$2\frac{1}{2}$ " to $3\frac{1}{2}$ "

NOTE ALSO: Type A123 is suitable for Earthing Cables up to 7/0.029" and for B.S. conduit sizes 1—5.

"Elmo" Earthing Clamps are of robust construction. Impossible for wire to pull out, always under tension, therefore a most satisfactory earth and a permanent safeguard.



ELECTRICAL FITTINGS



Flexible-to-rigid CONDUIT COUPLINGS

Made in zinc base alloy in the following sizes:

Electric Thread (Male) $\frac{3}{8}$ " $\frac{1}{2}$ " 1" $1\frac{1}{2}$ " $1\frac{3}{4}$ " 2"

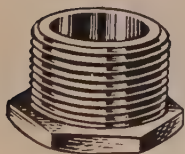
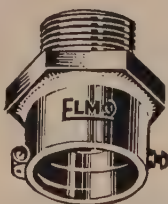
Inside Diameter $\frac{3}{8}$ " $\frac{1}{2}$ " 1" $1\frac{1}{2}$ " $1\frac{3}{4}$ " 2"

Electric Thread (Male) $\frac{3}{8}$ " $\frac{1}{2}$ " 1" $1\frac{1}{2}$ "

Inside Diameter Flexible Conduit $\frac{3}{8}$ " $\frac{1}{2}$ " $\frac{3}{4}$ " 1"

WITH EARTHING TERMINAL

Special Features: Integral Earthing Terminal, tinned ready for soldering. Fixing screw for continuity. Internal Threads suit all makes of flexible tubing.



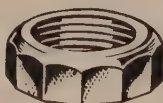
MALE
Hex. Section

CONDUIT BUSHES

Made in the following sizes:

MALE: Electric Thread $\frac{3}{8}$ " $\frac{1}{2}$ " 1" $1\frac{1}{2}$ " $1\frac{3}{4}$ " 2"

FEMALE: Electric Thread $\frac{3}{8}$ " $\frac{1}{2}$ " 1" $1\frac{1}{2}$ " $1\frac{3}{4}$ " 2"



FEMALE
Flat Face Section for
Spanner (except $\frac{3}{8}$ "
size, which is round)



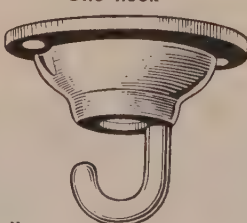
CONDUIT HOOK

For fluorescent lamps and overhead lighting fittings. Screwed $\frac{1}{2}$ " thread, male electric.

Made to fit all standard boxes with two holes $7/32$ " diameter — 2" centres diametrically opposed. Designed in accordance with British Standard Specification.

Both made in aluminium alloy

CEILING PLATE One hook



WEATHERPROOF METAL-CLAD
SOCKETS, PLUGS, SWITCH SOCKETS etc.
for all electrical purposes

NIPHAN

5-300 amp. 250-500 Volt

Diagram for
Temporary Lighting
with fittings
connecting to
6-way Tee



Cast Brass Terminal
Socket and Cover

Push-on Plug



Push-on Flange Socket
with Spring Cover



6-way Tee
and Cover

C.I. Switch

SIMMONDS & STOKES (NIPHAN) LTD

MANUFACTURING ELECTRICAL ENGINEERS

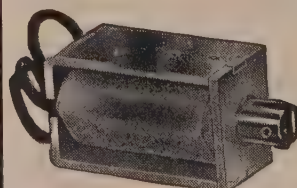
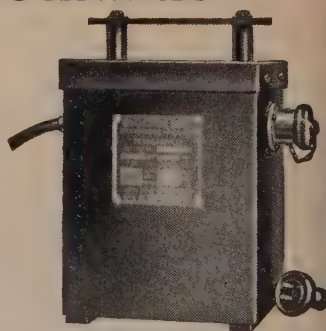
Victoria House, Southampton Row, London, W.C.1. HOLborn 2163, 8637

VOLTAGE DROPPING TRANSFORMERS

For Electric Tools on
110 volts

Full range of fixed and
portable types in all
capacities, or made to
specification. List free

**SIMMONDS BROS.
STOURBRIDGE**



PHIL-TROL SOLENOIDS

New 6-page Leaflet (No. 108) now available. Covers small and medium solid core types including new types 45, 35, 36 and 37.

Send for your copy now.

QUICK DELIVERY
Solenoids are normally
despatched same day
as receipt of order

PHILLIPS CONTROL (G.B.), LTD.

Dept. G21, Farnborough, HANTS Telephone: Farnborough 1120

Manufactured by **M. MOLE & SON LTD.**
BIRMINGHAM · 3 · ENGLAND Est. 1835



PHILIPS

(Clear & Pearl)

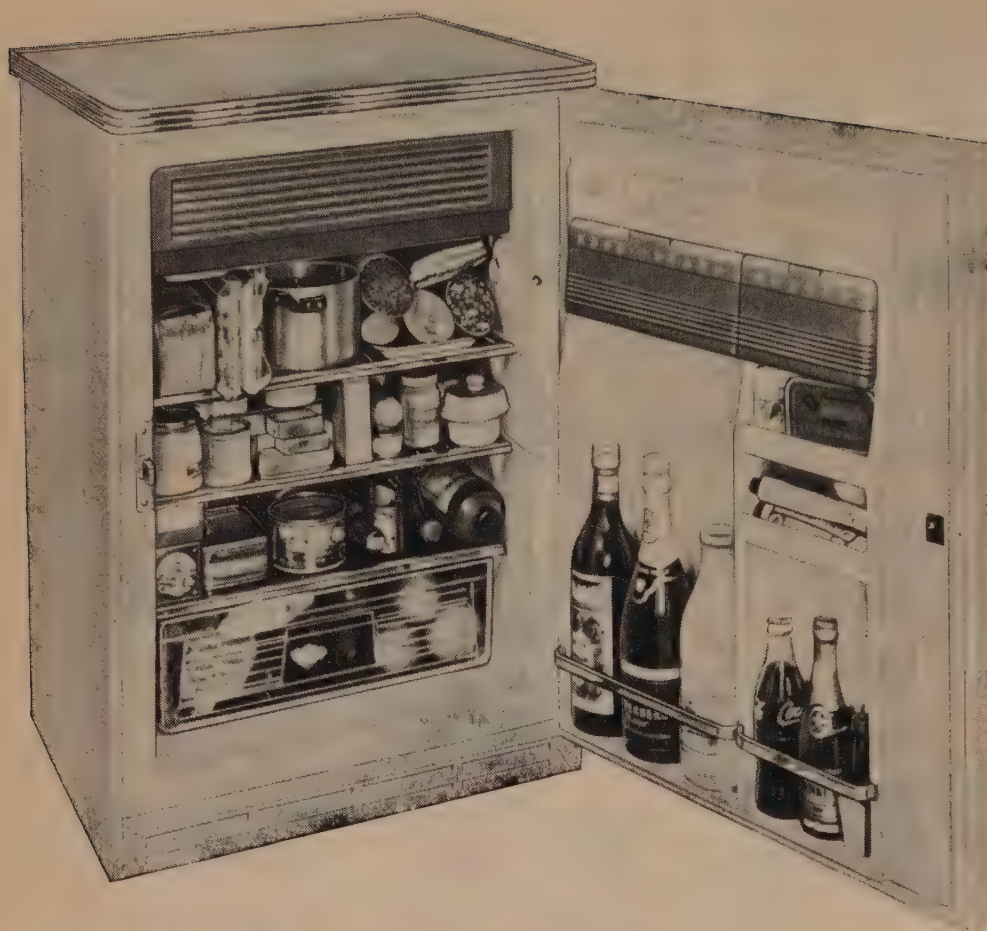
Coiled-coil LAMPS

ARE DOWN IN PRICE!

GENERAL PURPOSE LAMPS					
CLEAR OR PEARL	40w	~~1/6~~	NOW	1/5	
" "	60w	~~1/6~~	NOW	1/5	
" "	75w	~~2/3~~	NOW	2/2	
" "	100w	~~1/9~~	NOW	1/8	
All prices include purchase tax					

Philips coiled-coil (clear & pearl) lamps are now the same price as ordinary single coil lamps –yet give up to 20% more light

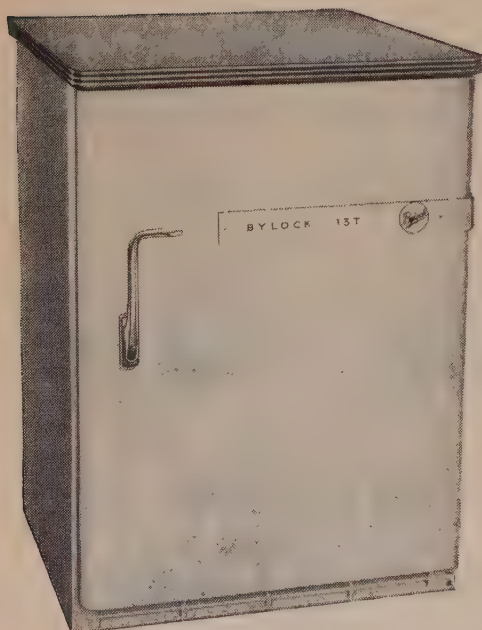
ORDER AT THE NEW PRICE NOW!



presenting
the

BYLOCK 13T

REFRIGERATOR



Backed by over 30 years' refrigeration experience, the Bylock 13T is a 'must' for your showrooms!

4.6 cubic feet capacity with 8.5 sq. ft. shelf space and large Freezer and Salad/Vegetable Crisper. Sealed refrigeration unit. External dimensions 33½" high x 24" wide x 22" deep. Beautifully finished in white and polished chrome with pale blue interior complete with light, flush opening door and attractive working table top. A new type handle is designed to enable the housewife to open the door with her wrist or elbow if her hands are full.

GUARANTEES: Refrigeration unit: 5 years.
Cabinet and accessories: 1 year.

Contact Bylock for full details of the 13T.

BYLOCK ELECTRIC LIMITED, ENFIELD, MIDDLESEX

MASSIVE OR MIDDLEWEIGHT...

... everything flows freely on

For factory or warehouse. Huge mobile testing equipment, massive trollies, the lightest storage bin—all are gliding easily from place to place, moved with a minimum of effort. Industry is flowing smoothly, freely, efficiently—thanks to FLEXELLO, the largest manufacturer of castors in Europe. Made to the most rigid standards, to support weights from a few pounds to twenty tons, there's a FLEXELLO castor from our vast range to cater for all requirements.

Flexello

constant
quality castors

'44' SERIES CASTORS:

A special series of Double Ball Bearing heavy medium duty castors, specially manufactured for export which have now become available for the home market.



This castor was specially designed and produced for aluminium production and has a load capacity of from 10 to 12 tons.

For further particulars write for catalogue E.R.
FLEXELLO CASTORS & WHEELS LTD., SLOUGH, BUCKS. TEL.: SLOUGH 24121



MECHANICAL HANDLING EXHIBITION

EARLS COURT MAY 3-13

STAND GG16 (Balcony)



QUICKWAY

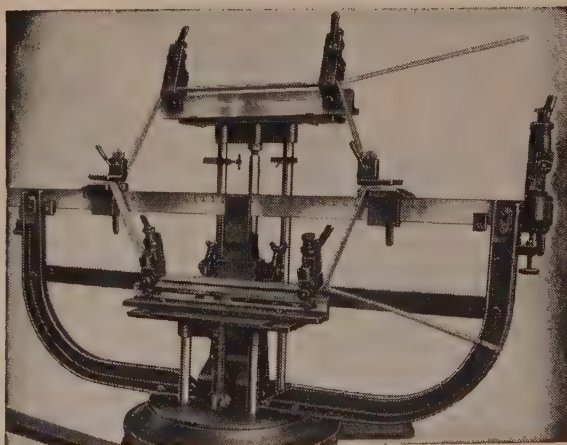
THE QUICKWAY

coilwinding and forming machine is used by leading manufacturers and repairers of electrical equipment and produces a wide range of uniformly shaped armature and stator coils.

The standard machine produces formed coils up to 28in. loop length. Additional attachments can increase the range up to 42in. loop length.

Also available in the 'QUICKWAY' range are armature winding and taping machines.

Coil winding and forming machines



Send for further details to
the 'QUICKWAY' Department:

THE MIDLAND DYNAMO CO. LTD.
QUICKWAY WORKS, LEICESTER - Tel. 20172 (5 lines) - Grams: 'DYNAMO' LEICESTER

DIESEL GENERATOR SETS

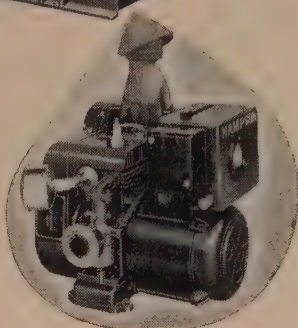
From 1 up to
500 kVA



To produce electric light and power for all purposes The World famous Hampson units can also be arranged for automatic starting in the event of a failure of the Public Mains supply, so that a continuous source of Electrical power is always available.

Manufacturers of the large t range of Generating Sets in the World, from a Portable to complete power for an entire town

HAMPSON INDUSTRIES LIMITED
WEST BROMWICH, ENGLAND

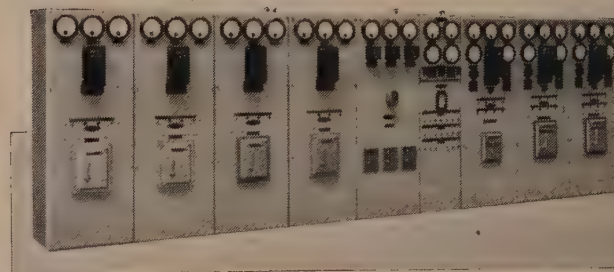


SPECIAL SWITCHBOARDS AND ELECTRONIC CONTROL PANELS

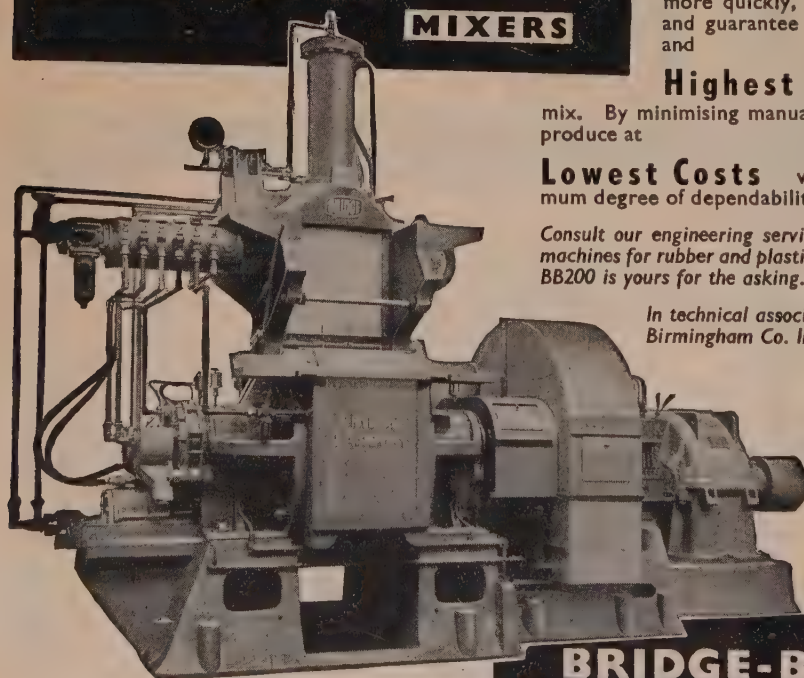
Below is shown a multi-control and feeder panel with push button circuit breaker control and metering equipment for a 1000 kVA substation. It incorporates electronic timers for process timing of a number of machines in a large factory engaged on automation.



Hampson will design and make any control panel to suit any requirements.



Bridge-Banbury MIXERS



SIZE 11 BRIDGE-BANBURY

Produce the Highest Output

more quickly, more efficiently, and guarantee a more uniform and

Highest Quality

mix. By minimising manual operating they produce at

Lowest Costs with the maximum degree of dependability and safety.

Consult our engineering service on layouts and machines for rubber and plastics. Our catalogue BB200 is yours for the asking.

In technical association with Farrel-Birmingham Co. Inc. U.S.A.

BRIDGE-BANBURY
Automation

DAVID BRIDGE & CO. LTD., CASTLETON, ROCHDALE, LANCs

Phone: CASTLETON (ROCHDALE) 57216

LONDON OFFICE: BROUGHTON HOUSE, 6-7-8 SACKVILLE STREET, PICCADILLY, W.1

Phone: REGENT 7480

Grams: Coupling Phone Castleton Lancs

Grams and Cables: "EDERACEO" Piccy London



SIZE 8 BRIDGE-BANBURY



SIZE 1A BRIDGE-BANBURY

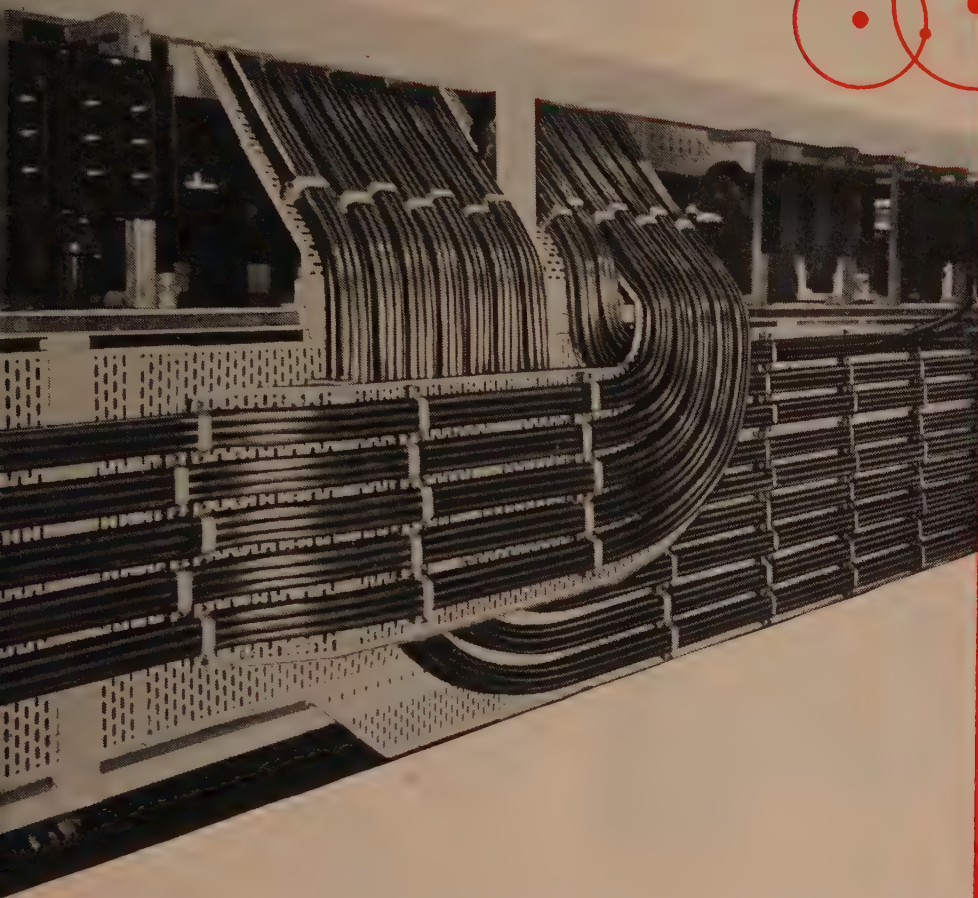


SIZE 9 BRIDGE-BANBURY



SIZE 27 BRIDGE-BANBURY

TODAY'S CABLE



for tomorrow's energy

Today electrical energy is produced one way—tomorrow another. But the “end product”, the electrical power itself, has to be carried, and experience shows that however current *generation* may change, power *transmission* for many purposes is best left to “Pyrotenax”—for many reasons. Pyrotenax M.I.C.C. cables have been the consistent choice of electricity supply authorities for years. Twenty years ago the most “modern” power stations installed “Pyrotenax”—and the same original cabling still serves today. Little wonder that in this present age too—this “atomic” age—“Pyrotenax” is being specified for the lighting and power services in various nuclear power stations and in homes, schools, offices and factories throughout the country.

*there is no substitute
for experience*

PYROTENAX LIMITED • HEBBURN-ON-TYNE

Telephone: Hebburn 83-2244/8

LONDON: Victoria 3745 • BIRMINGHAM: Midland 1265 • MANCHESTER: Deansgate 3346/7 • LEEDS: Leeds 27826 • GLASGOW: City 3641/2 • CARDIFF: Cardiff 23689

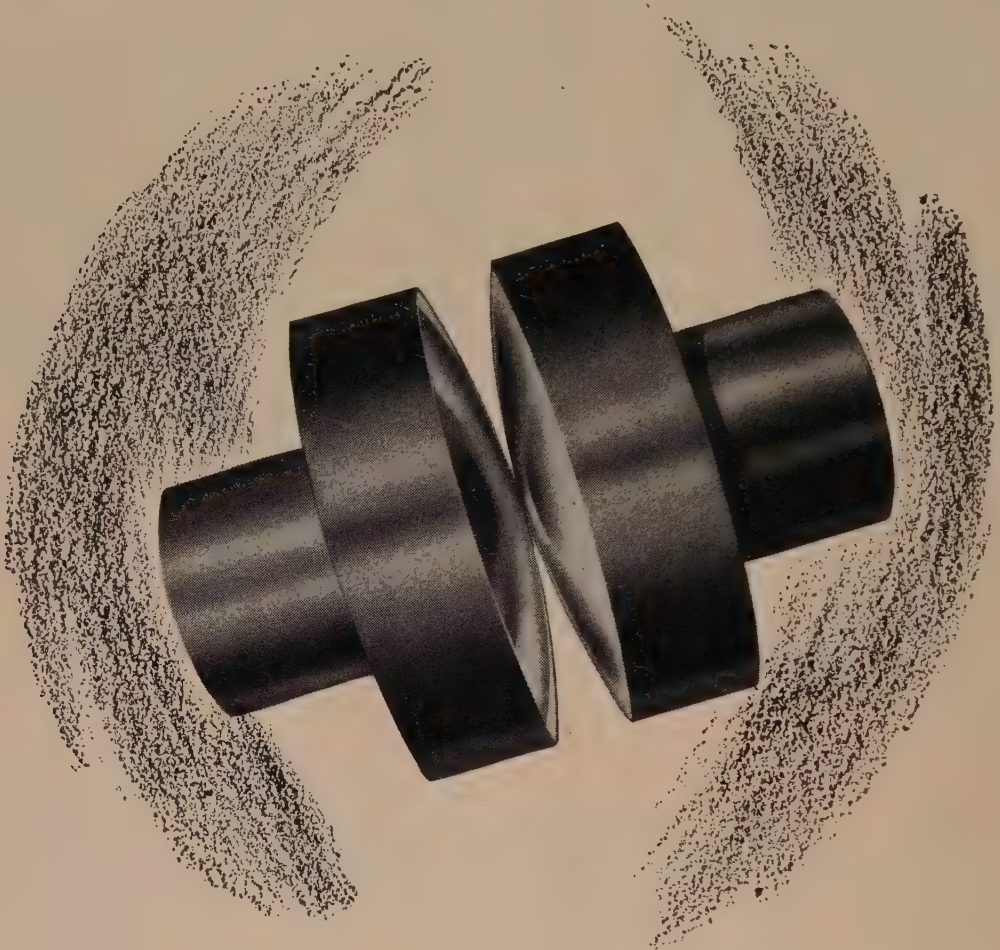


The use of the trade name "Pyrotenax" is exclusive to the products of this Company and its associates.

Non-fire causing—
heat resisting—moisture-
proof—non-ageing—
rust-proof—safe against
overload—resistant
to mechanical
maltreatment—resistant
to noise transmission.



tête-à-tête



Put two heads together (of the same shape) and the result is a cheaper job . . .

In the majority of medium duty contact applications, two domed rivets will perform as well as the domed/flat combination often employed. The adoption of one type of rivet instead of two means that your ordering quantities go up and our price goes down. Nor is that the only saving—for your storage and handling problems are also simplified.

Specialised Products of

Johnson  **Matthey**

Domed rivets are only a small part of the JMC range of electrical contacts. We have immense experience of contact problems—let's put our heads together to help you with yours.

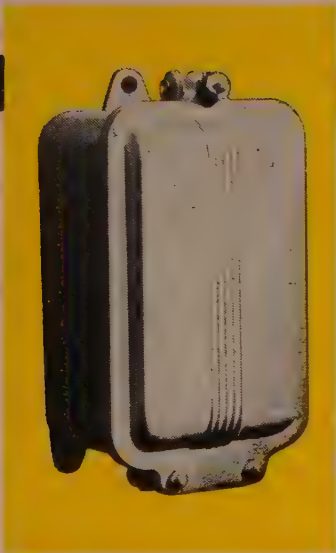
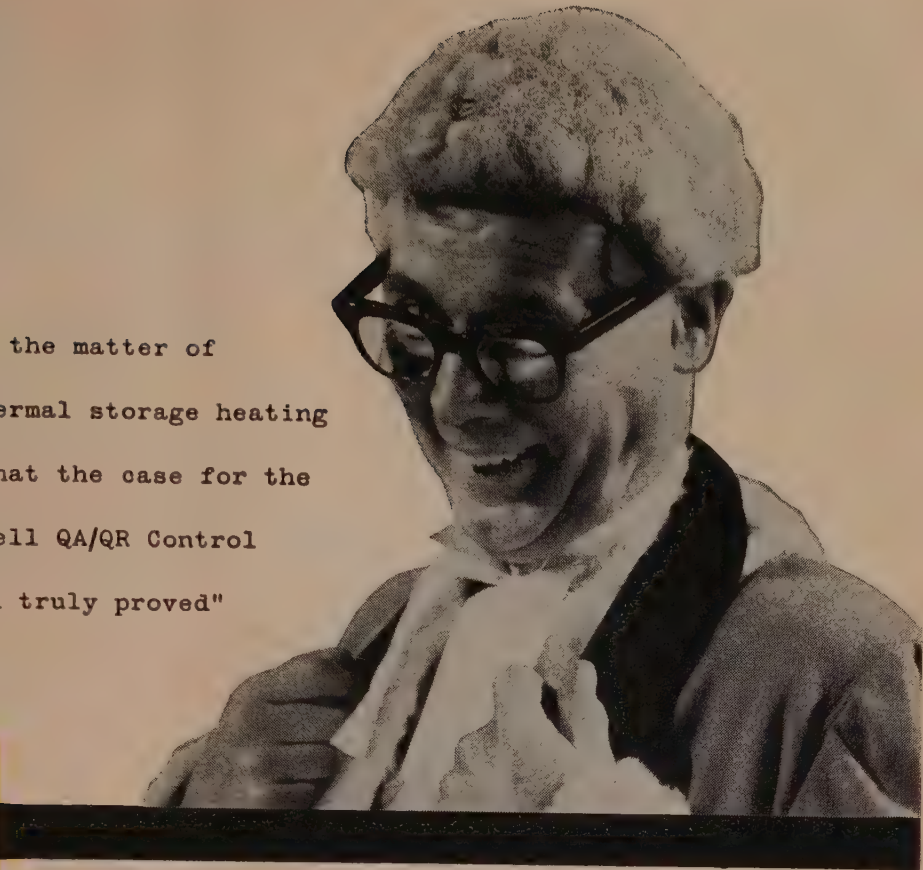
JOHNSON, MATTHEY & CO., LIMITED, 73-83 HATTON GARDEN, LONDON, E.C.1

Telephone: Holborn 6989

Vittoria Street, Birmingham, 1. Telephone: Central 8004

75-79 Eyre Street, Sheffield, 1. Telephone: 29212

"In the matter of
Electric thermal storage heating
I submit that the case for the
Satchwell QA/QR Control
is well and truly proved"



The QA external thermostat, incorporating a small electric heater, enclosed in a weather-proof case

And many Electricity Boards throughout the country think so too. Practical tests have established the value and control quality of the QA/QR system; one Supply Authority has reported a saving in current consumption of 36%.

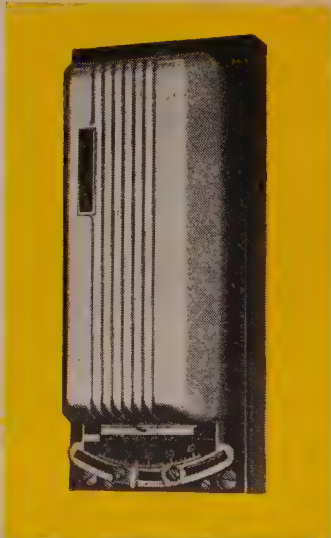
The QA/QR system is simplicity itself, employing both internal and external

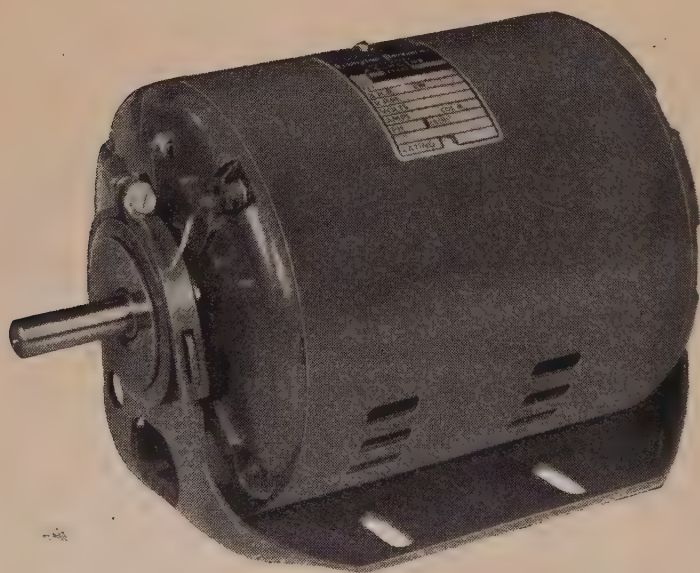
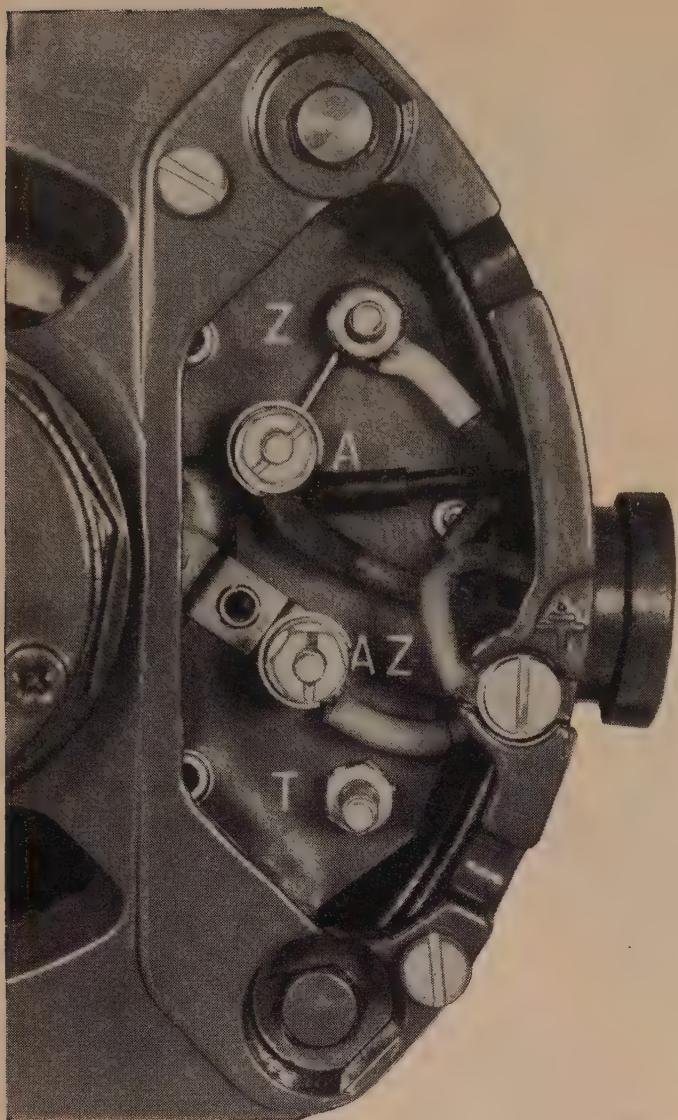
The QR internal thermostat which is mounted inside the building and set to the required room temperature

temperature sensitive units which govern the charging time. Installation presents no problem at all, and the system is one of the most efficient available for this type of application, at a very low initial cost.

May we send you list T2 which gives full details?

THE RHEOSTATIC CO. LTD.
SLOUGH · BUCKS · SLOUGH 23961





DESIGNING



AND MAKING F.H.P. MOTORS

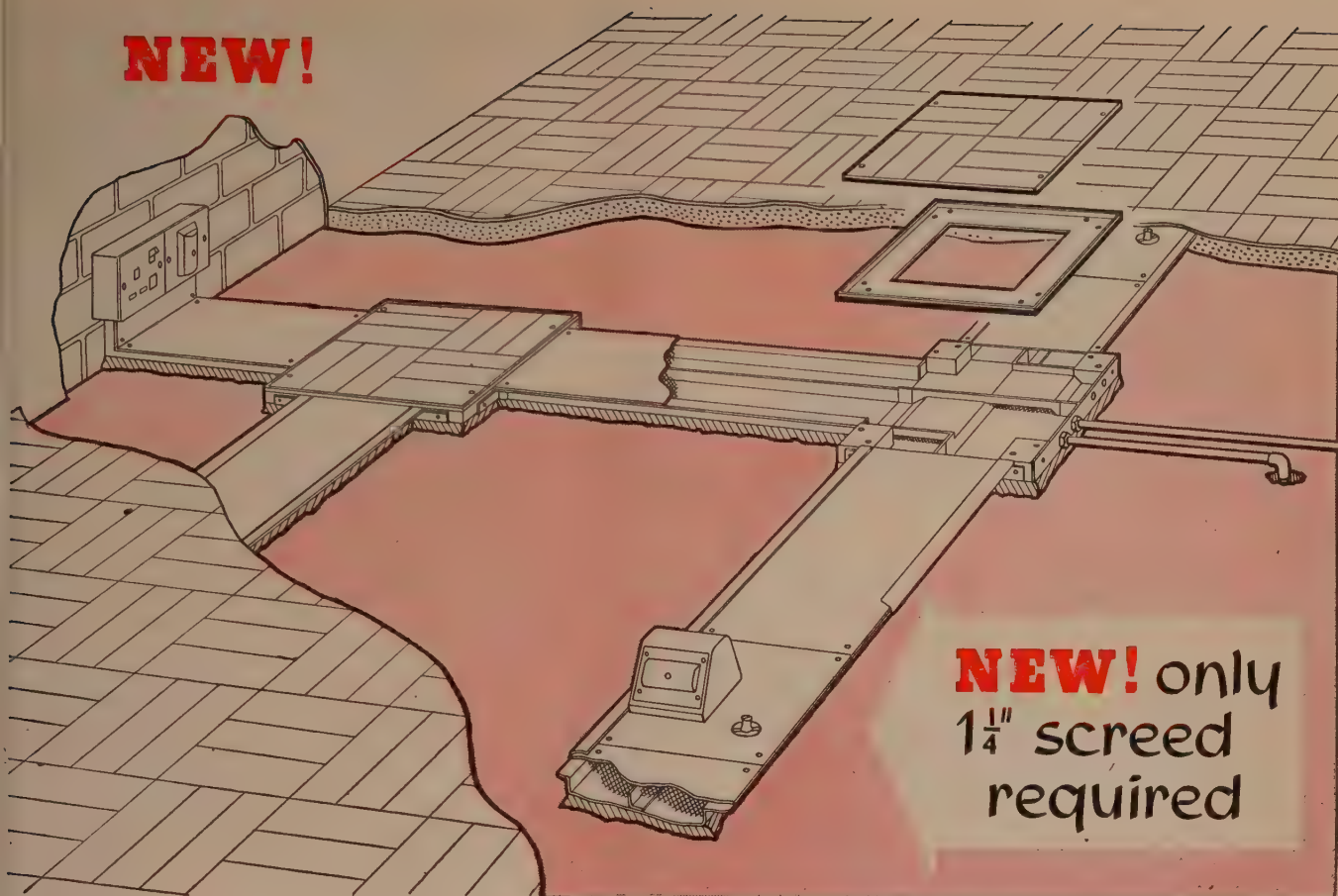
Something important has been obscured by the success of the mathematical approach to design – that engineering is an art as well as a science. Not everything can be worked out: beyond a certain point – particularly on detail – the designer has to trust his eye, his feeling for a sound job or his imagination. But these, in turn, depend on experience, not his alone; the common stock of the people he works with. This is the art; and it is the channel through which the accumulated experience of an engineering firm is fed back into new products.

The details in which it shows up sometimes seem trivial in themselves, but in aggregate they are important. A very simple example is the terminal box on our new F.H.P. motors. It is unusually large and the terminals are far bigger than the current that they carry would require. As a result, the motor is exceptionally quick and easy to connect up. Why, then, do not all small motors have large terminal boxes? Well, room has to be found on a small end-cover for a thermatrip, a bearing with a generous oil well and ventilation openings. Our designers have fitted them all in so successfully that there appears to have been no problem. It looks simpler than it is . . . which is often the way with good design.



Crompton Parkinson LIMITED

Makers of Electric Motors of all kinds, A.C. and D.C. Generators, B.E.T. Transformers, Switchgear, Cables, Instruments, Lamps, Lighting Equipment, Batteries, Stud Welding Equipment, Traction Equipment, Ceiling Fans.

NEW!**NEW!** only
1 1/4" screed
required

GREENWOOD-AIRVAC INTRODUCE A STANDARDISED FLOOR DUCT SYSTEM

FLUSHFYT

for telephone and all electrical services

The new Greenwood-Airvac "Flushfy" Floor Duct System provides a distribution system for all telephone and electrical services. With a small number of standardised units you can achieve the greatest possible flexibility in layout. For ease of installation the new G.A. "Flushfy" System cannot be bettered.

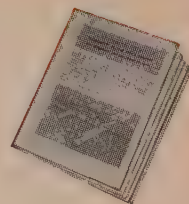
★ Duct covers can be supplied fitted with 1 1/4" diameter outlets or may be added at any future date.

★ Adjustable floor frame to accept final floor finish.

★ All services in one duct. Central division to segregate telephone from electrical services.

★ Skirting Terminal Boxes and Universal Pedestal Units for floor connection.

Write for
full details
and new
"FLUSHFYT"
leaflet today!



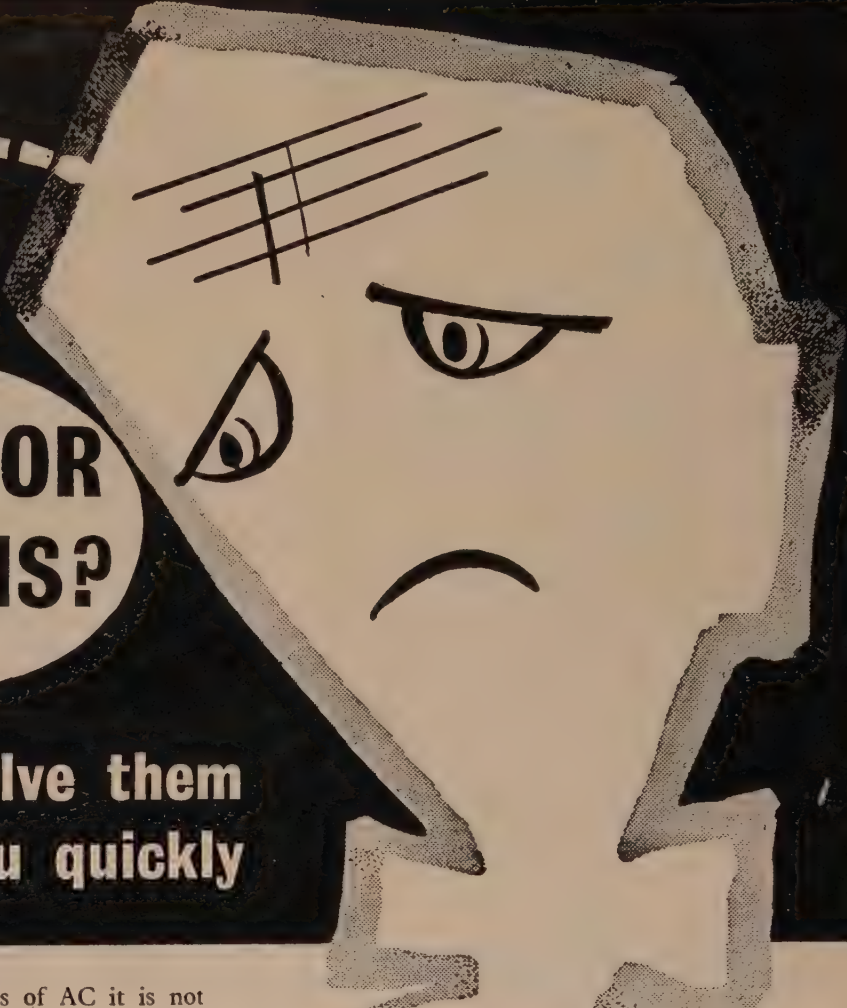
Greenwood Airvac Conduits Ltd



Patentees, Designers and Manufacturers of Electrical Conduit Systems

CARLISLE HOUSE, 8 SOUTHAMPTON ROW, LONDON, W.C.1. CHAncery 9377 (3 lines) 'Grams: Aircon, Westcent, London

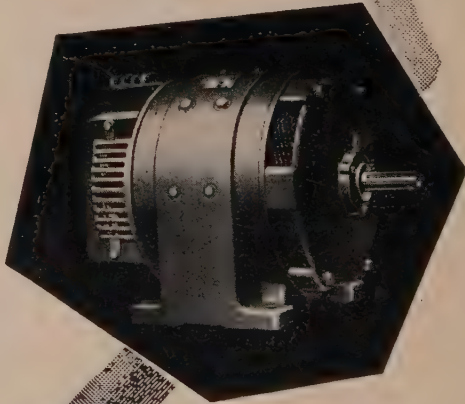
GC 71



D.C. MOTOR PROBLEMS?

**-let E.P.E. solve them
for you quickly**

In these days of AC it is not always easy to get DC motors and generators quickly and at a reasonable price. Fortunately, EPE specialise in DC equipment, bringing years of experience to bear on the subject, so that one can always be sure of DC motors and generators, of any enclosure, at competitive prices, on short delivery. EPE are always happy to help solve DC problems, too.



E·P·E

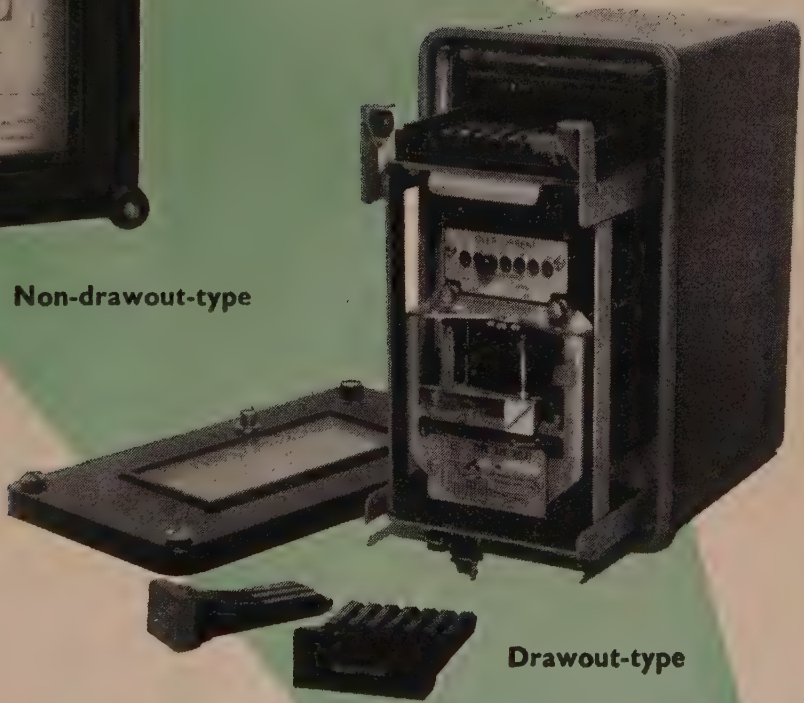
**ELECTRICAL POWER
ENGINEERING CO. (B'ham) LTD.**
Bromford Lane, Birmingham 8

'Phone: STEchford 2261
'Grams: Torque 'Phone Birmingham
London Office: 421, Grand Buildings, Trafalgar
Square, W.C.2. 'Phone: WHItchall 5643 and 7963

Reyrolle Relays



Non-drawout-type



Drawout-type

**for protection
and control
service**

Reyrolle

A. REYROLLE & COMPANY LIMITED - HEBBURN - COUNTY DURHAM - ENGLAND

It's NEW!

and entirely automatic

the **NIFE-O-MATIC** Switchgear Unit cuts costs of operation and maintenance

The Nife-o-matic system solves the problem of maintaining full closing and tripping voltage in a unit which can be safely left unattended for extensive periods. It is suitable for a wide range of service in industry. Nife-o-matic units incorporating an automatic charge circuit are in addition to the well tried NIFE manually operated units.



THESE ARE THE ADVANTAGES

- * Automatically compensates for normal discharges and external leakage currents, thereby maintaining the battery in a fully charged condition.
- * Excessive gassing and frequent topping up are eliminated.
- * Operation is entirely electrical. No moving parts.
- * Operation and maintenance costs lower than for any other type of unit.
- * Constant voltage maintained across transformer primary despite fluctuation of up to $\pm 6\%$ in mains supply.
- * No need to remove battery at any time for special charging.
- * All steel construction.
- * Units may be installed in any convenient position without the need for a separate room.

**Incorporates the famous
NIFE Nickel-Cadmium Alkaline battery—
the most frequently specified battery for
switch-tripping applications**



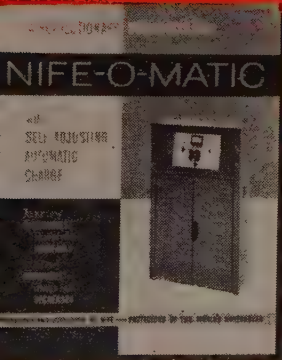
For these electric arc furnaces a Nife-o-matic installation is used to initiate 250 switching operations a day, with a coil current of 7 amperes. Despite the high frequency of use, the battery is always 'at the ready' with optimum voltage.

WITH ACKNOWLEDGEMENTS TO BRYMBO STEEL WORKS LTD., WREXHAM



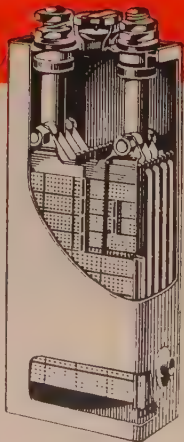
NIFE-o-matic SWITCHGEAR

for all industrial and sub-station applications



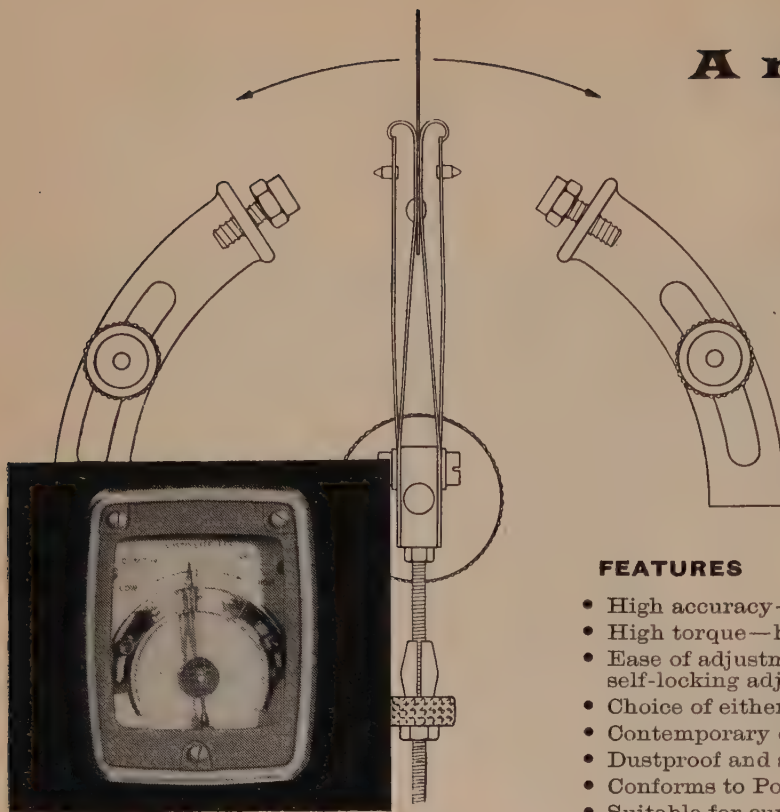
To: NIFE BATTERIES, REDDITCH,
WORCESTERSHIRE

*Please send me your illustrated folder dealing with the
new Nife-o-matic Switchgear Unit.*



NAME _____
COMPANY ADDRESS _____
APPOINTMENT _____

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE



A new and more sensitive Austinlite relay

APPLICATIONS

- * Current regulator control.
- * Voltage regulator control.
- * Monitoring duties.
- * Limiting duties.
- * Equipment protection.

FEATURES

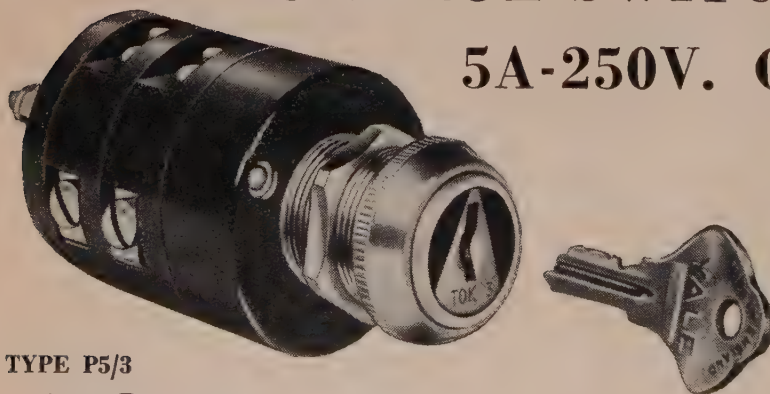
- High accuracy—to within $\pm 0.5\%$.
- High torque—hence positive contact pressure.
- Ease of adjustment with fine and coarse settings and self-locking adjustable contacts.
- Choice of either two or four adjustable contacts.
- Contemporary case design—projection or flush mounting.
- Dustproof and suitable for use in the tropics.
- Conforms to Post Office Specification P.T. 1025 B.
- Suitable for current or voltage sensing on either D.C. or A.C.

Austinlite ELECTRICAL EQUIPMENT CUSTOM-BUILT BY **STONE-CHANCE LTD.**
(MAKERS OF SUMO PUMPS AND STONE-CHANCE LIGHTHOUSES) CRAWLEY, SUSSEX.

TYPE P5/1

NEW A **TOK** PACKET TYPE CONTROL SWITCH

5A-250V. ONLY 1½" DIA.



Increases the range of Rotary
Packet Switches to
cover from 5 to 60 amps.

TYPE P5/3

TOK

ROTARY SWITCHES

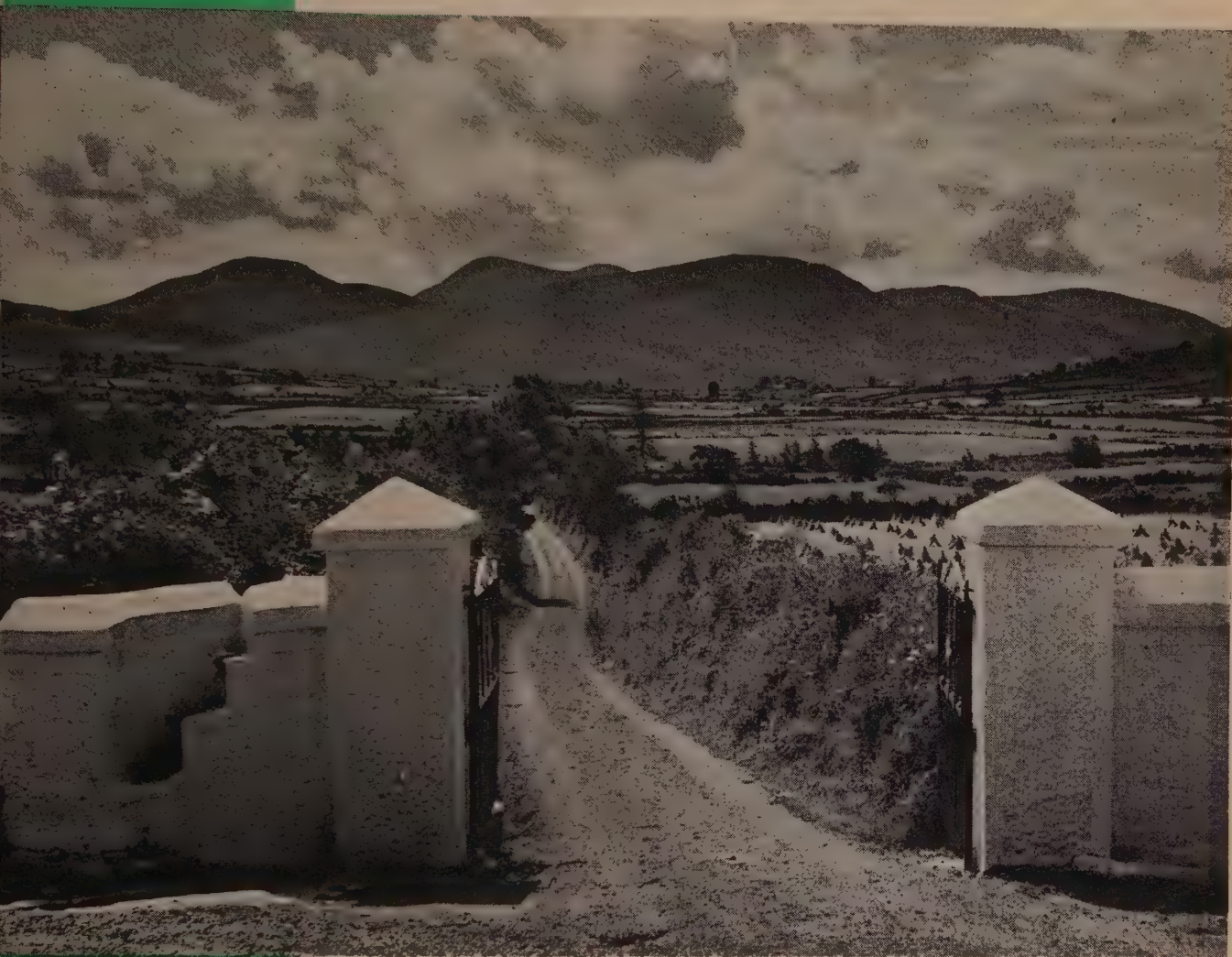
TOK ELECTRICAL AND INDUSTRIAL MECHANISMS LTD.

REGISTERED OFFICE; 17 BURY STREET, LONDON, E.C.3

Telephone: Avenue 5035 · Telegrams: Tokswitch, London

**'Tis distance lends enchantment to the view,
And robes the mountain in its azure hue.**

(Pleasures of Hope by Thomas Campbell)



By courtesy of Tourist Information Centre, Belfast

Irish cables are manufactured amidst scenery depicted above, showing the famous and beautiful Mourne Mountains

IRISH CABLES will stand inspection right through to the very core, as a result of the high quality of materials used and constant vigilance and inspection throughout manufacture

IRISH CABLES LIMITED

NEWCASTLE • CO. DOWN • NORTHERN IRELAND

Telephone : Newcastle (Co. Down) 2331/2

WANDLESIDE WARREN WIRE CO. LTD.
DUNMURRY • Northern Ireland
Telephone : Dunmurry 2535

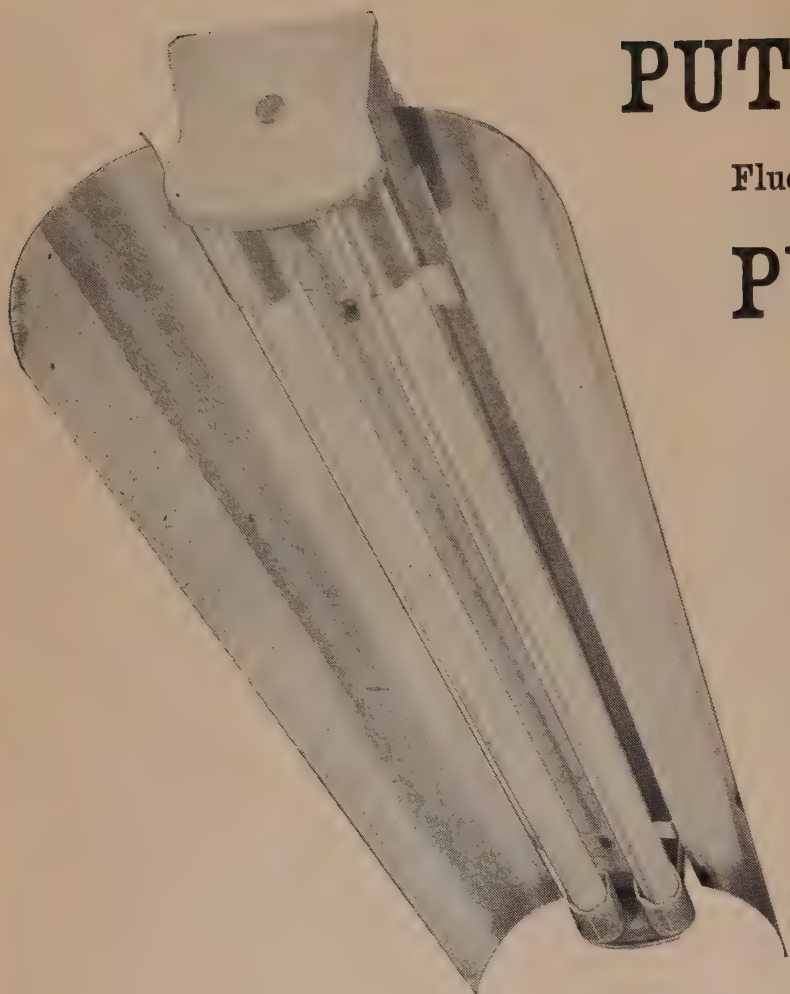
London Office :
19/21 FITZROY STREET
LONDON, W.1
Telephone : LANgham 8317/9



PUT UP SIELECT

Fluorescent Lighting Fittings

PULL DOWN LIGHTING COSTS



Here are three good reasons why *you* will be particularly interested in the new SIELECT range of fluorescent lighting fittings:

- Low first cost
- Easy to install and maintain
- Adaptable and reliable

The range of models includes fittings both with and without reflectors and also an attractive reeded perspex diffuser design all in either single or twin lamp versions.

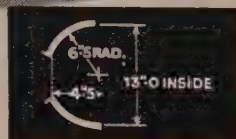
You'll want more information about Sielect fittings because they meet such a wide variety of commercial, industrial—and even domestic—needs, so send now for our folder PD11/F33.

Following the reorganisation of the A.E.I. Group these products continue to be sold from former Siemens Edison Swan offices throughout the country. Our staff are unchanged and your enquiries and orders will be welcomed.

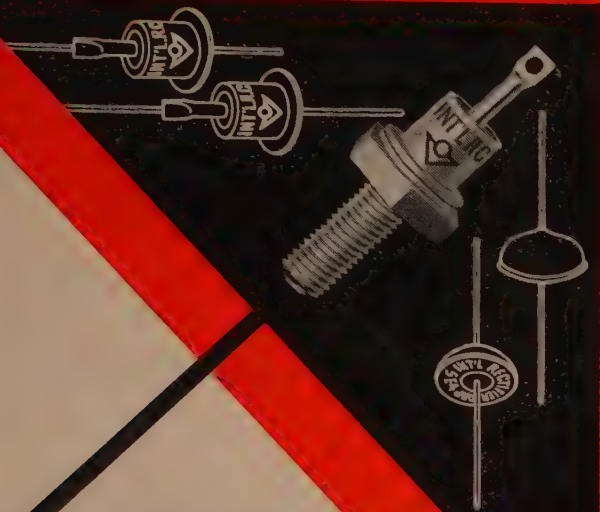


LAMPS AND LIGHTING

38/39 Upper Thames Street, London, E.C.4



International — a complete range of SILICON DEVICES



MEDIUM POWER SILICON DIODES

High temperature military types. New economical encapsulated series. Zener Diodes, 1 and 10 watt rating.



HIGH POWER SILICON DIODES

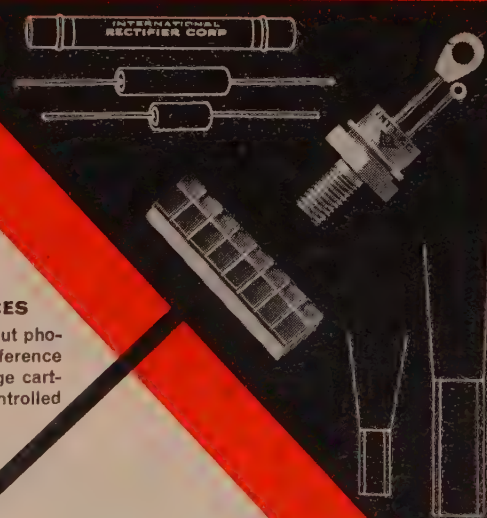
Ratings
25 to 250 amperes
50 to 800 P.I.V.

Drawings not to scale

International Rectifier have now established their manufacturing facilities at Oxted and are able to offer a complete range of silicon devices.

Our Engineering Department will be pleased to examine and advise on your application problems.

*Write for Silicon short
form catalogue just issued.*



SPECIAL SILICON DEVICES

Solar Cells, Readout photocells, Voltage reference packs, High Voltage cartridge rectifiers, Controlled Rectifiers.

INTERNATIONAL RECTIFIER CO (GREAT BRITAIN) LTD
OXTED • SURREY • ENGLAND

Telephone: OXTED 3215

BRITISH ASSOCIATE COMPANY OF
INTERNATIONAL RECTIFIER CORP. • CALIFORNIA • U.S.A.
The world's largest suppliers of industrial metal rectifiers—selenium, germanium and silicon



JEARY

for the best industrial electrical equipment

Specialists in Geared and Fractional H.P. Motors

Distributors of :

- Crabtree Motor Controllers • M.E.M. Switch and Control Gear
- Fans - Propeller and Axial Flow including Flame Proof up to 36"

M.K. Stockists

TIME SWITCHES

JEARY ELECTRICAL CO. LTD. Estab. 1887

Main Stores, 132/143 East Road, London, N.1.

Tel.: CLErkenwell 4141

THE WINNING TAPE



Take no chances-use

ROTUNDA

INSULATING TAPES



ROTUNDA LIMITED • DENTON • MANCHESTER

CRYSELCO

SLIMLINE CHANNEL FITTINGS



5 ft 80W

F55120/C

£3 19 0

(Excluding Lamp)

QUICK START

£5 5 0

4 ft 40W

F55121/B

£3 9 0

(Excluding Lamp)

QUICK START

£4 15 0

3 ft 30W

F55122

£3 9 0

(Excluding Lamp)

2 ft 20W

F55123

£3 6 0

(Excluding Lamp)

Remember to order CRYSELCO lamps at the same time

CRYSELCO LIMITED KEMPSTON WORKS BEDFORD

BRANCHES— BIRMINGHAM • BRISTOL • BURY ST. EDMUNDS • CARDIFF • GLASGOW • LEEDS
LEICESTER • LIVERPOOL • LONDON • MANCHESTER • NEWCASTLE • NOTTINGHAM • SOUTHAMPTON

CORD JACKETED WITH DU PONT NEOPRENE LASTS LONGER



Harsh treatment is the inevitable lot of portable cords, whether they perform their duties in the machine shop or in the kitchen. Heat, oil and grease, chemicals and ozone are some of the things they have to put up with. What's more, the cord is dragged over rough surfaces and sharp edges . . . it is twisted, kinked and pulled.

Cords jacketed with Du Pont neoprene will stand up to this treatment. No wonder more and more wire and cable manufacturers are using it to ensure good performance from their products. There are cases on record of Du Pont neoprene jacketing giving protection to cord for over twenty years. No other present day jacketing material approaches neoprene in actual service history. Specify Du Pont neoprene and get the best in jacketing.

Send coupon below for booklet showing how Du Pont neoprene protects wire and cable; or contact us for more information.

DISTRIBUTORS:

Du Pont Company (United Kingdom) Ltd.,
76 Jermyn Street, London S.W.1.



DU PONT NEOPRENE

BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

Du Pont Company (United Kingdom) Ltd.,
76 Jermyn Street, London S.W.1, England.
Electrical Review—5/60—GB (21 765 01)
Please send me booklet A7122 on Du Pont
neoprene jacketing for wire and cable.

NAME
POSITION..... COMPANY.....
ADDRESS.....
CITY COUNTRY

Are Pressings your Problem?



If the answer is 'yes' let us solve your problems for you. We manufacture precision presswork to any specification required, efficiently and with prompt attention. Every order is handled with the same interest and care that has built our reputation as master craftsmen. This reputation is your assurance of complete satisfaction. We invite your enquiries. The items illustrated are a few from our range of pressings for the Electrical Industry.

HAMPTON WORKS

(STAMPINGS) LIMITED

TWYNING ROAD · STIRCHLEY · BIRMINGHAM 30

Tel: KINgs Norton 2901

Grams: RADiAGILLS BIRMINGHAM

Enamel
covered



WIRES and STRIPS

**F.D.
SIMS
LIMITED**

P.O. Box 8 Hazelhurst Works, RAMSBOTTOM, Manchester
Telephone: Ramsbottom 2213/4/5 Telegrams: "SIMS" Ramsbottom

London Office and Stores:

106 Newlands Park, Sydenham London S.E. 26

Telephone: SYDenham 4211/2

METWAY

TERMINAL BLOCKS 5-75 AMP.

STEATITE
NYLON
FIBRE



BAKELITE
P.V.C.
RUBBER

ASK FOR CATALOGUE NBQ/12ER

RUBBER GROMMETS METWAY



BUSHES
ETC

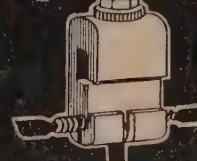
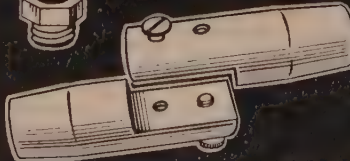
PRODUCTS
REGISTERED TRADE MARK



ASK FOR CATALOGUE RGR/5ER

BRASS ACCESSORIES METWAY

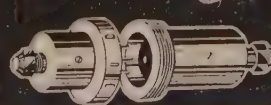
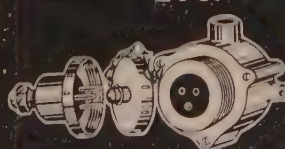
PRODUCTS
REGISTERED TRADE MARK



ASK FOR CATALOGUE OHS/1ER

INDUSTRIAL PLUGS CABLE CONNECTORS ETC.

METWAY
PRODUCTS
REGISTERED TRADE MARK



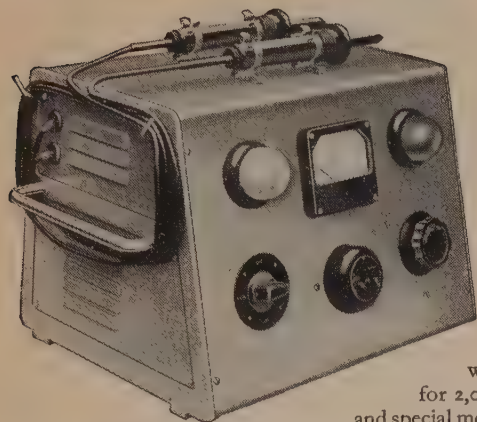
ASK FOR CATALOGUE OHS/3ER

WE SHALL BE PLEASED TO SEND THE ABOVE CATALOGUES

METWAY - KEMP TOWN - BRIGHTON

ZENITH

Insulation Flash Test Sets



with *"VARIAC" primary control providing continuous regulation of the H.T. voltage down to zero. Voltages up to 30 kV.

On the left is our standard portable type with safety retractable test prods; models for 2,000 volts and 3,000 volts are usually in stock and special models for higher voltages are designed to order.

Mobile sets as illustrated on the right are designed for the flash testing of equipment such as traction motors: a controller-type voltmeter is fitted, the large scale being visible when the test piece is not immediately adjacent.



Outputs
up to 4 kVA

*Regd. Trade Marks

Our catalogue is available on request

THE ZENITH ELECTRIC COMPANY LTD.

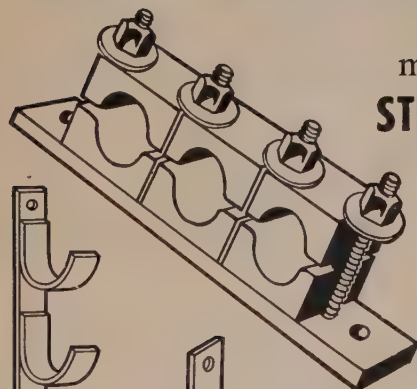
ZENITH WORKS, VILLIERS ROAD, WILLESDEN GREEN, LONDON, N.W.2

Telephone: WILlesden 6581-5

Telegrams: Voltaohm, Norphone, London

MANUFACTURERS OF ELECTRICAL EQUIPMENT INCLUDING RADIO AND TELEVISION COMPONENTS

CABLE INSTALLATIONS



We
manufacture
**STEEL CABLE
HANGERS
AND
SUPPORTS
OF
ALL KINDS**

OVER
30 YEARS'
EXPERIENCE

**CLEATS
CABLE RACKS
CABLE ROLLERS**

GENERAL STEELWORK
TO CUSTOMER'S OWN
SPECIFICATION

ILLUSTRATED BROCHURE ON REQUEST

ENQUIRIES WELCOMED

ROBERT McGREGOR LTD.

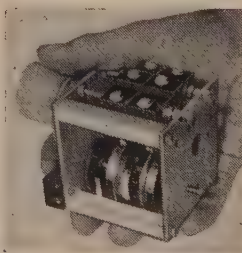
Alpine Steelworks, East Molesey, Surrey

Telephone: MOLesey 556

ELECTRICAL REMOTE CONTROL CO. LTD.

Manufacturers of Electrical Timing and Control Apparatus

- ★ Range of fully automatic process timers for AC and DC.
- ★ Range of cam operated hand reset process timers for AC and DC.
- ★ Multiple contact and mercury relays for AC and DC.
- ★ Special purpose control panels to customers' requirements.



Miniature automatic synchronous time type ZX 1-12 continuously adjustable independent timing circuits with or without time setting dials. Timing ranges between 0-30 seconds and 0-28 days. Switching capacity 10 amp at 230V AC. Overall dimensions of 2 circuit unit 2½ in. x 3½ in. x 5½ in.

HARLOW, ESSEX
Telephone: Harlow 24285

BRITISH MICANIZING CO. (Great Barr) LTD.

**BAKELITE
FABRICATORS**

IN

SHEETS • TUBES • RODS

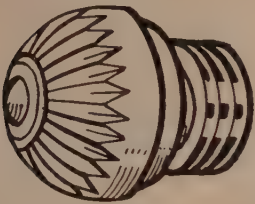
MACHINED PARTS

ELECTRICAL INSULATION MANUFACTURERS
Newton Road, Great Barr, Birmingham, 22

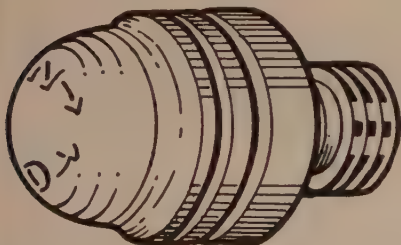
Phone: GREAt Barr 1021

34 CIRCUIT VARIATIONS WITH THE NEW THORN 5-TERMINAL ILLUMINATED PRESS SWITCH

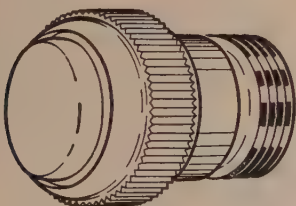
3 ALTERNATIVE CAPS



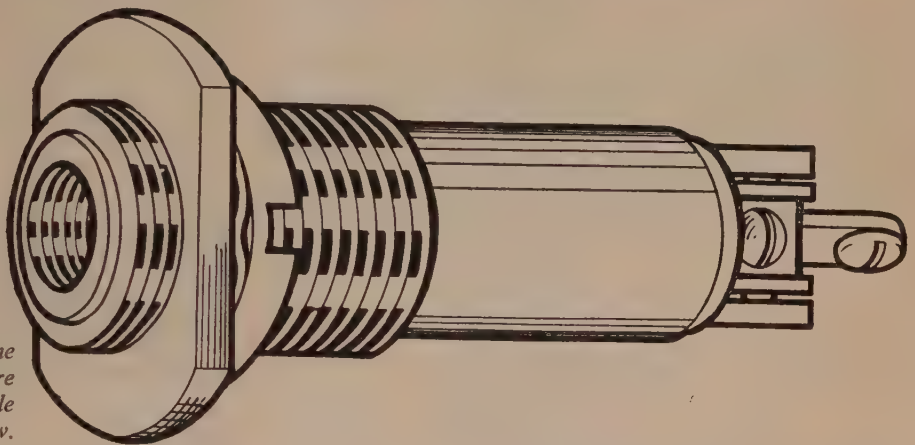
Transparent Indicator Cap in Polystyrene or Glass with surface facets to ensure visibility from all angles. Colours available Red, Green, Amber, Clear, Blue, Yellow.



Dimmer Cap in metal and glass with metal rotary shutter. Built-in stops restrict rotation between fully shuttered and open positions. Colours available, Red, Green, Amber, Clear, Blue.



Flat top Indicator in Polystyrene with engraving to order. Colours available Translucent Red, Amber, Green, White and Transparent Blue.



This extremely compact Illuminated Press Switch employs the now famous Atlas Midget Panel Lamp and by the incorporation of the 5-terminal arrangement, is capable of 34 circuit variations. As shown, three different caps can be employed for indicating or dimming purposes and each is available in a wide range of colours. The units are vibration proof, maintaining predetermined contact pressures and can be supplied for 6, 12 and 28 Volt circuits. Screw terminal or solder tag versions are available to order.

Overall dimensions:

with dimmer cap: $3\frac{1}{16}" \times 1\frac{1}{16}" \times \frac{3}{4}"$ approx.

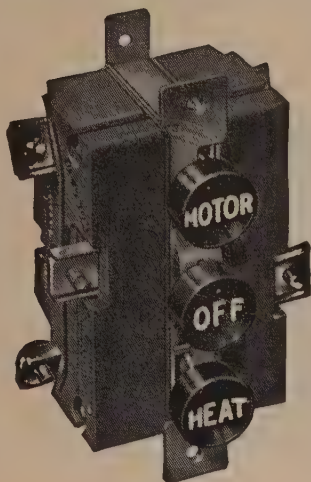
with indicator cap or

flat top indicator cap: $2\frac{7}{8}" \times 1\frac{1}{16}" \times \frac{3}{4}"$ approx.

THORN 3-TERMINAL PRESS-TO-TEST FITTINGS

and Midget Indicator Lampholders are employed in Britain's leading civil and military aircraft and are widely used throughout the electronics and automation industries. The 5-TERMINAL ILLUMINATED PRESS SWITCH is a worthy addition to this range.

FOR HEATED WASHING MACHINES



Jelson

PRESS
BUTTON
SWITCHES
ARE A

TECHNICAL ADVANCE WITH
COMMERCIAL ADVANTAGE

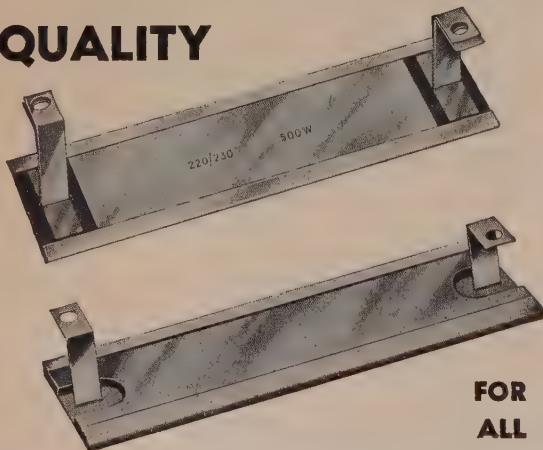
Two AC only 15 amp 250 v. D.P. Switches in one unit—ceramic insulation. Three varieties of operation—Independent, Interlocked sequence or Interlocked changeover. With or without manually reset Thermal trip for Heating Element and/or current overload trip for protecting Motor.

We shall be pleased to send full details.

JELSON ELECTRIC LTD. PHONE: ACO. 0866
SPRING ROAD, TYSELEY, BIRMINGHAM 11

ELEMENTS

OF
QUALITY



FOR
ALL
WASHBOILERS

THE ELECTRIC ELEMENTS CO.
Tokenhouse Yard
NOTTINGHAM

Makers of Elements since 1921
Stocked by Leading Wholesalers

Low Voltage LIGHTING TRANSFORMER

*With 1, 2, or 3
Arm Brackets*



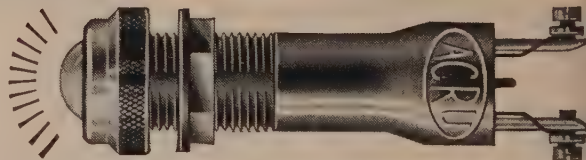
Weatherproof · Aluminium Casin
D.P. On-Off Switch · Primary and
Secondary H.R.C. Fuses · Plug
and Sockets fitted if desired.



**JOHN DRUMMOND
(ENGINEERS) LTD**

BELLCRAG WORKS · DALSHOLM ROAD · GLASGOW N.W.
Tel: MARYhill 3315 4

ACRU NEON INDICATOR LAMP



Used by most Electronic and Electrical Manufacturers throughout the world. Supplied with one-hole fixing. Average life 25,000 hours. There are over twenty-five models. Voltages from 60 to 440.

Ask for details of our new S.E.S. and M.C.C. fittings.

ACRU ELECTRIC TOOL MFG. CO. LTD.
Acru Works, Demmings Road, Councillor Lane, Cheadle, Cheshire. Tel.: GATley 60

ALLEN-BRADLEY

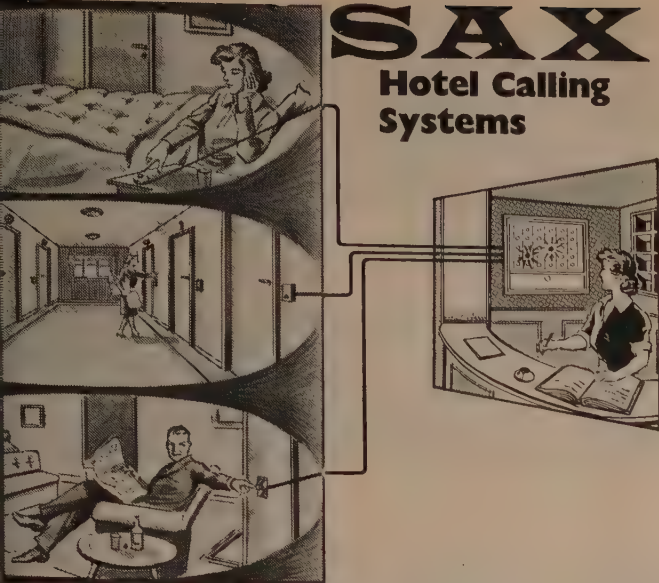
MOTOR



CONTROL

consult

KEMPSTON ELECTRICAL CO. LTD.
KEMPSTON, BEDFORD. Phone: Kempston 2358/9



SAX

Hotel Calling
Systems

Luminous Call Systems including
Door Fittings, Relays, Master
Indicators, Pushes, etc., to suit
all requirements.

Advice and Prices also diagrammatic layouts on request

JULIUS SAX & CO. LTD. 24 COMMERCE RD., BRENTFORD, Middx
Telephone. ISLeworth 6034/5

Transformers by Sturdy

FROM 500 VA
TO 200kVA

REGULARLY
SUPPLIED TO
NATIONAL COAL
BOARD, CENTRAL
ELECTRICITY GENERATING
BOARD, AND MANY OTHER LARGE
INDUSTRIAL UNDERTAKINGS



Typical 200 kVA
Transformer

ALSO

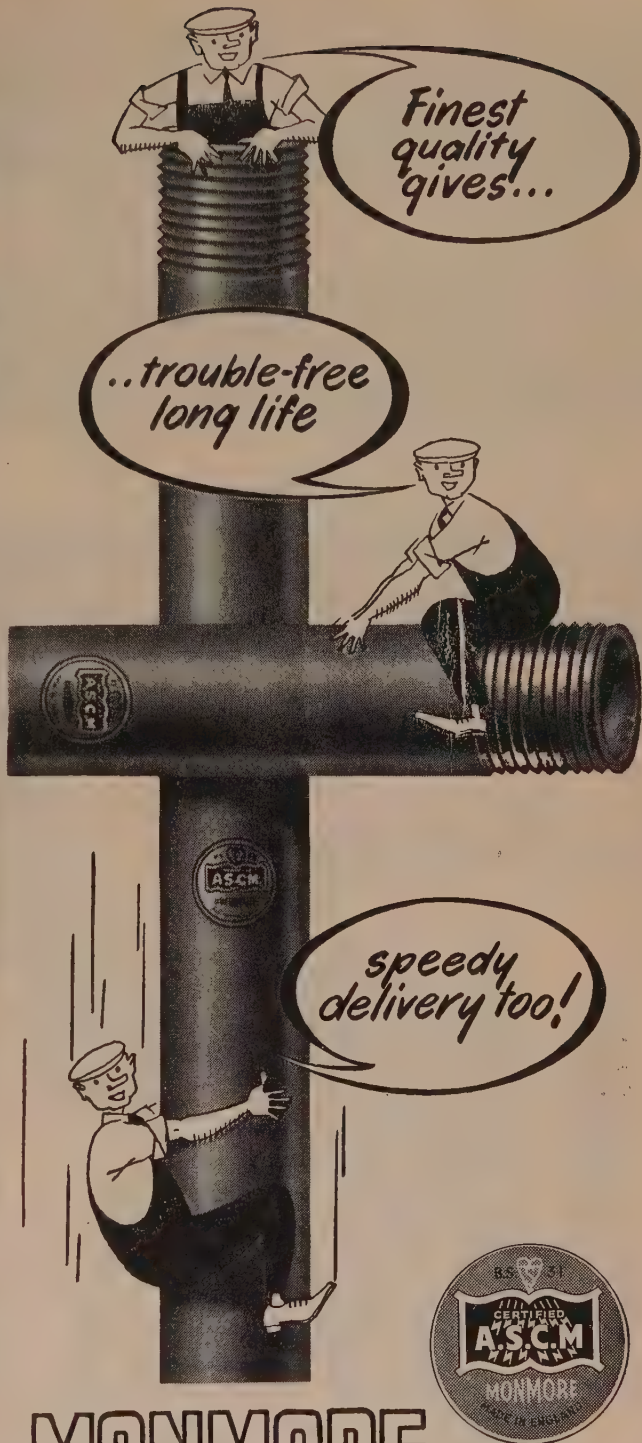
Power Transductors

FOR FINGER-TIP MANUAL OR
AUTOMATIC CONTROL OF POWER
UP TO 500 kVA

Sturdy ELECTRIC CO. LTD.
HAMSTERLEY COLLIERY
NEWCASTLE-UPON-TYNE

PHONE: EBCHESTER 271/2

TELEGRAMS: STURDITRAN, NEWCASTLE-UPON-TYNE



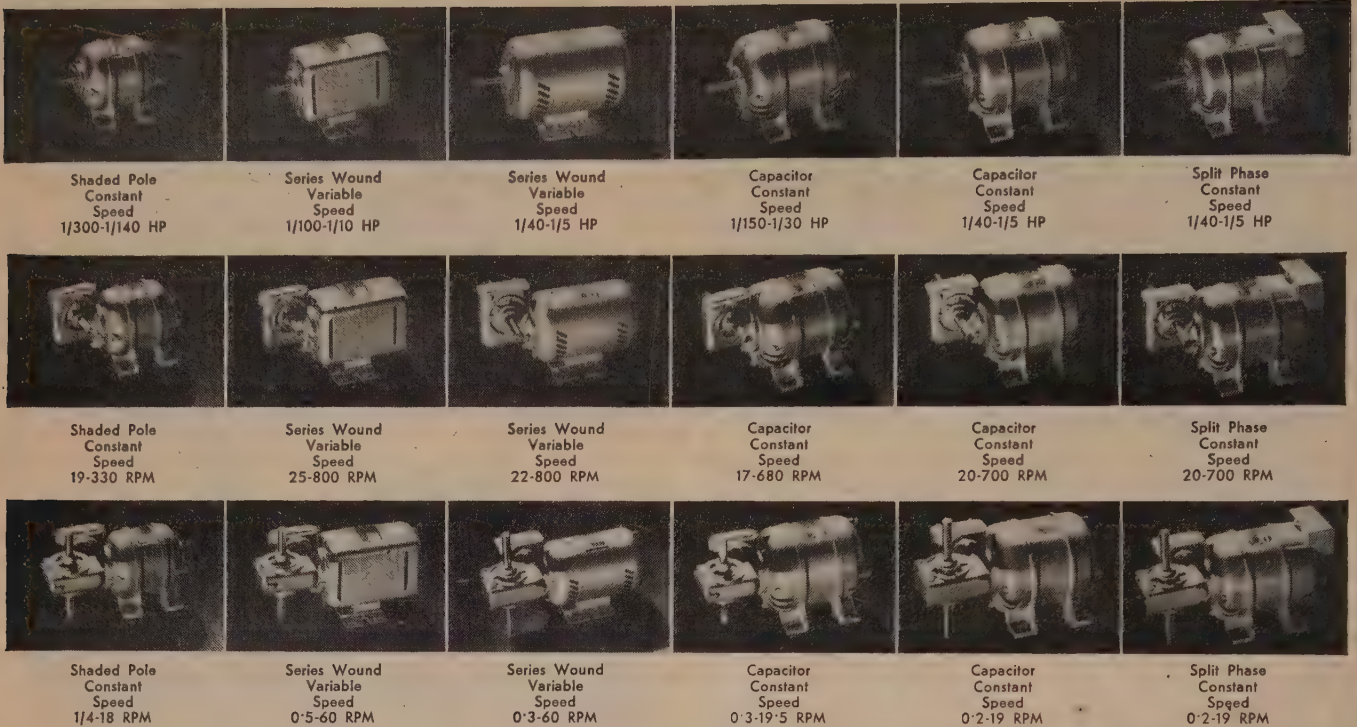
MONMORE CONDUITS

IN DUCTILE
STEELS
GROUP



**MONMORE
TUBES LTD.**
WOLVERHAMPTON
TELEPHONE : 27091 (5 LINES)

A SELECTION FROM THE RANGE OF PARVALUX F.H.P. MOTORS



REGD. TRADE MARK
PARVALUX
 LIMITED

OUR 1960 BROCHURE AVAILABLE ON REQUEST

PARKSTONE, POOLE, DORSET, ENGLAND Tel: Parkstone 5411/2 PBX Grams: Parvalux Parkstone



That nut must *stay* tight.
 That pin securely locked.
 Either way, the job calls for
 GROVERLOK.
 GROVERLOK spring lock-
 washers, in girder, flat or
 square section ensure that
 any nut will remain tightly
 fixed.

GROVERLOK spring ten-
 sion pins fit accurately,
 tightly, without special
 drilling or reamering.
 Both can easily be used by
 unskilled labour, both are
 thoroughly reliable.

GROVER & CO. LTD.

BRITANNIA ENGINEERING WORKS
 CARPENTERS RD., LONDON, E.15
 TELEPHONE: MARYLAND 4342-3



IF IT'S RUBBER — YOU CAN BANK ON
BANK BRIDGE
 BANK BRIDGE RUBBER CO. LTD.
 Clayton, Manchester 11 * Telephone: EAST 2041/2

R E A L

REFLECTORTIGHT

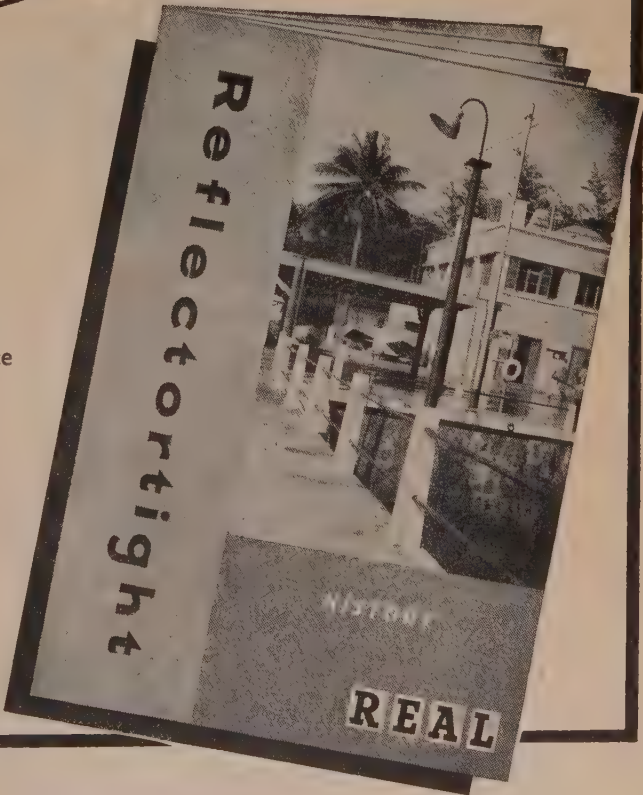


HIGH-EFFICIENCY
Plus **PROVED**
**RESISTANCE TO
CORROSION**

REFLECTORTIGHT HISTORY

A factual Progress Report of performance under truly heavy-duty conditions. This book details a variety of industries where the Reflectortight has been PROVED. It deals with problems of erection and maintenance and answers a number of the questions most usually asked by Engineers with experience (often bitter experience) of lighting in corrosive atmospheres.

SEND FOR YOUR COPY NOW . . .

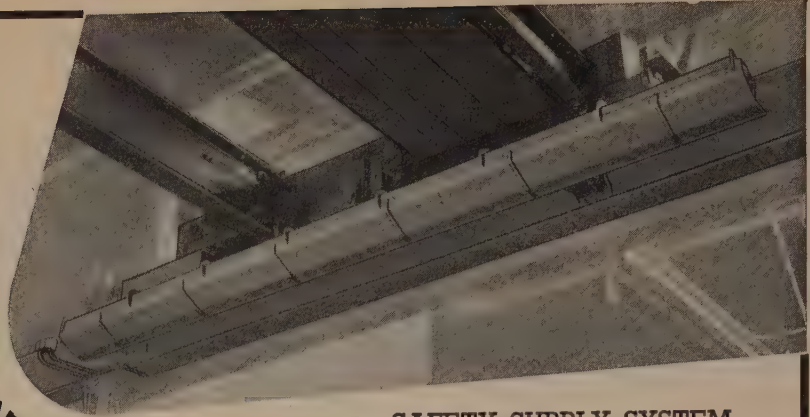


R.E.A.L. IS A REGD. TRADE MARK

ROWLANDS ELECTRICAL ACCESSORIES LIMITED, R.E.A.L. WORKS, BIRMINGHAM, 18

A NEW NAME MEANING
COMPLETE SAFETY IN
POWER SUPPLIES TO
TRAVELLING
CRANES

Manguard



SAFETY SUPPLY SYSTEM
(Prov. Patent No. 31568/88)

PRINCIPLE

The principle of Manguard is the provision of a set of flexible bar collectors on the crane and electrically protected contact boxes at intervals along the crane track connected by insulated cable.

SAFETY FEATURES

- Contact box spacing ensures an electrical supply to the crane at all times.
- Each contact box has its own contactor ensuring that the contact studs are alive only when in contact with the crane collector bars.
- The crane collector box is fabricated in fibreglass. The four contact bars are bedded in flexible polyurethane, giving long life and minimum maintenance.
- Isolation of any section may be readily carried out.
- MANGUARD equipment may be fitted to existing cranes.

DEBERGUE

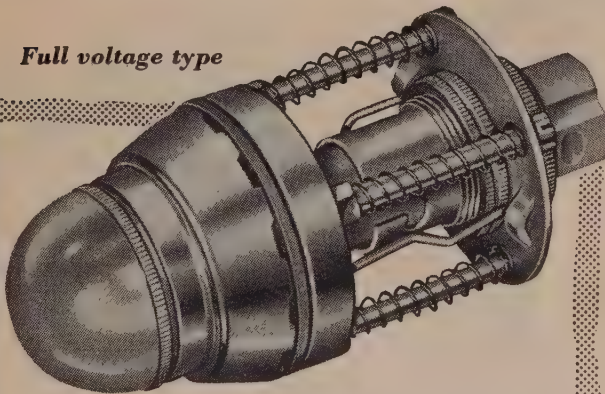
MACHINE TOOLS LIMITED

WEST GORTON, MANCHESTER 12

TELEPHONE: EAST 2771 (8 LINES)

TELEGRAMS: DEBERGUE, MANCHESTER

Full voltage type



the new
special
feature
Indicator
Lamp

This new oiltight indicator lamp unit incorporates a special feature which results in low running temperatures and minimum size.

Write for details
now!



CRAIG & DERRICOTT LTD.
ROYAL WORKS, SUTTON COLDFIELD
Nr. Birmingham Tel.: Sutton Coldfield 7716/778

for
**Electrical
Insulation**

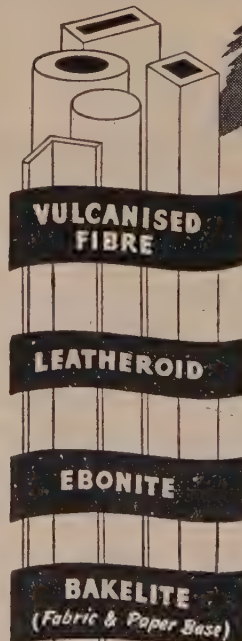
of every type

The largest and most comprehensive range of insulating materials in the country. Supplied in sheet, rod and tube form.

For any type of electrical insulating material we can usually give ex stock or early delivery. We can offer strip and coil form material cut accurately to size for stamped components. Most grades of insulating material can be offered in this form with quick delivery and competitive prices. Also fabricated parts can be manufactured to suit individual requirements.

Please write or 'phone if further details or samples are required.

Also
Turned and
Pressed
Parts



**HEAVEN, DOWSETT
& Co Ltd.**

INSULATION HOUSE, 315 WELLINGTON ROAD
BIRMINGHAM 20

Phone: BIRchfield 6218-9 Grams: Fibre B'ham 20



SERVICE

IN SEVEN LEAGUE BOOTS

We produce a comprehensive range of high-quality Electronic Components. Consult our catalogue for your requirements. Our "By Return" Service will ensure immediate despatch of your orders.

A 24 hr Service
for
**ELECTRONIC
COMPONENTS**



Radiospares Ltd.

4-8 MAPLE STREET • LONDON W.1 • ENGLAND

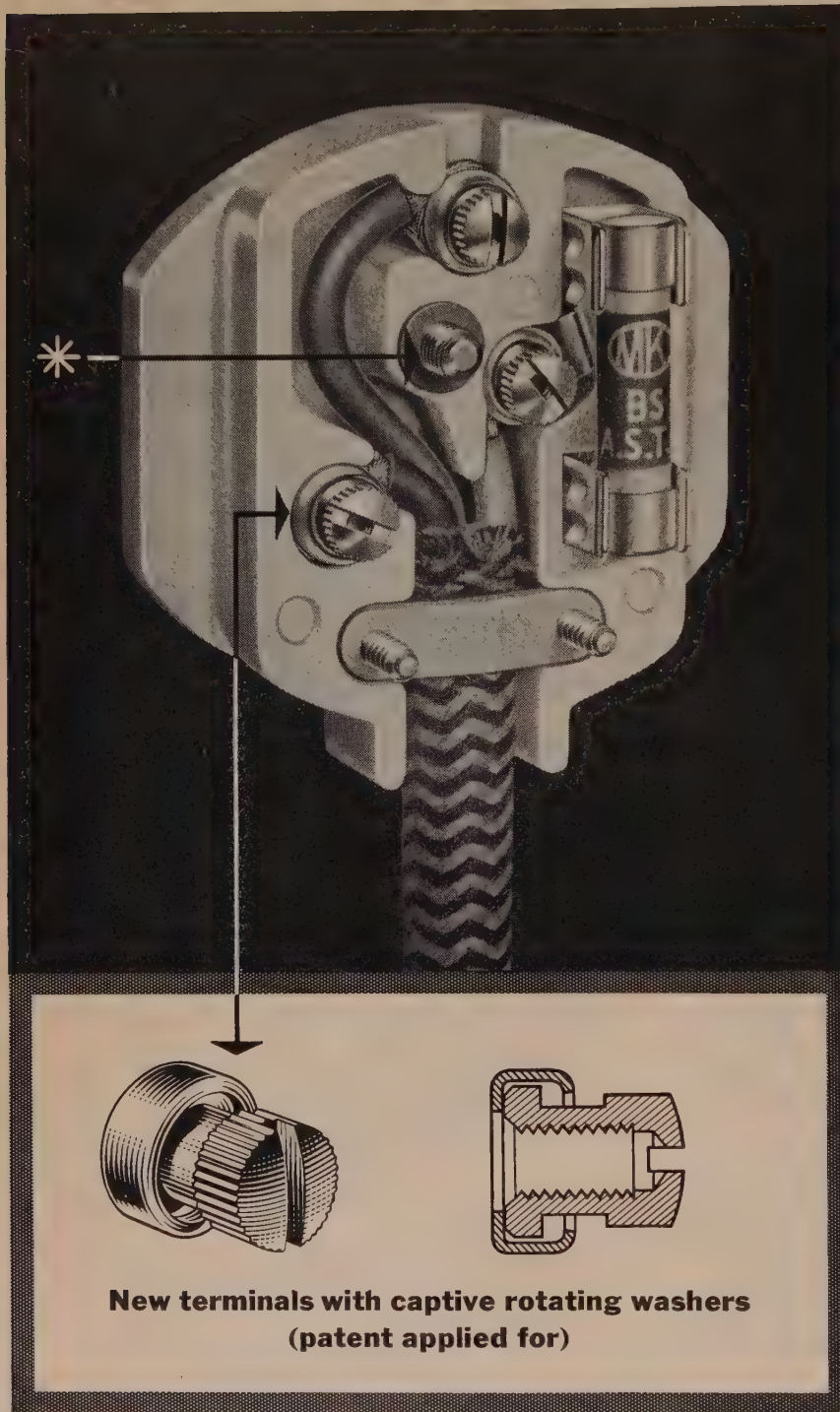
Telephone: EUSon 7232-9

TELEGRAMS: RADOSPERES, WESDO, LONDON

CABLES: RADOSPERES, LONDON

FURTHER ADVANCES IN 13 AMP. PLUG DESIGN

(BS 1363)



MK 179 DHB

New terminals with captive rotating washers! A tremendous advance—speeds wiring and ensures that washers are not lost or forgotten.

***Cover screw now captive with the plug body cannot be lost and saves handling time. "Shakeproof" spring washer (also captive with the screw) ensures a firm and non-loosening fixing.**

* * * *

Extended finger shields give maximum protection for the fingers whilst providing a firm and natural grip.

"One Piece" plug pins and terminals permanently secured to the plug body. Stranded conductors easily and quickly wrapped around non-rotating terminal studs. A secure and efficient connection without the danger of cutting the conductors as likely with some "Pinching Screw" type terminals.

The M.K. Cartridge Fuse-Link (ASTA certificate of rating has been obtained) is secured in integral silver-plated contact clips for minimum contact resistance and low temperature rise. Enclosed within the plug for absolute safety yet quickly replaced by a twist of the captive cover securing screw.

Plug cover and body are track-resisting mouldings.



FOR LEADERSHIP IN 13 AMP. PLUG DESIGN

Send for leaflet 255

M.K. ELECTRIC LTD., SHRUBBERY RD., EDMONTON, LONDON N.9 EDMONTON 5151

THE SOUND APPROACH TO QUIET!

... install clean, streamlined N.S.E. Partitioning, establish a happy congenial atmosphere and increase staff efficiency.

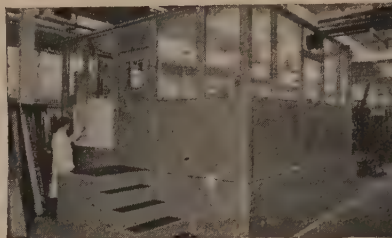
EASY
TO ERECT,
ADAPTABLE,
ECONOMICAL.

FOR OFFICE
AND FACTORY
... it must be



STEEL PARTITIONING

Inspect the full range of N.S.E. Partitioning and Office Equipment at our modern Showrooms in
BRISTOL, BIRMINGHAM and MANCHESTER
or visit our London Display Centre
149 BOROUGH HIGH STREET, S.E.1.



Send
TO-DAY
for our
NEW FREE
fully illustrated
36-page Catalogue.

NORWOOD STEEL EQUIPMENT LTD., HOWARD WAY, HARLOW, ESSEX.

TEL: HARLOW 25651

CHANNEL "Spring Capped" CONDUIT

ELECTRICAL TRUNKING

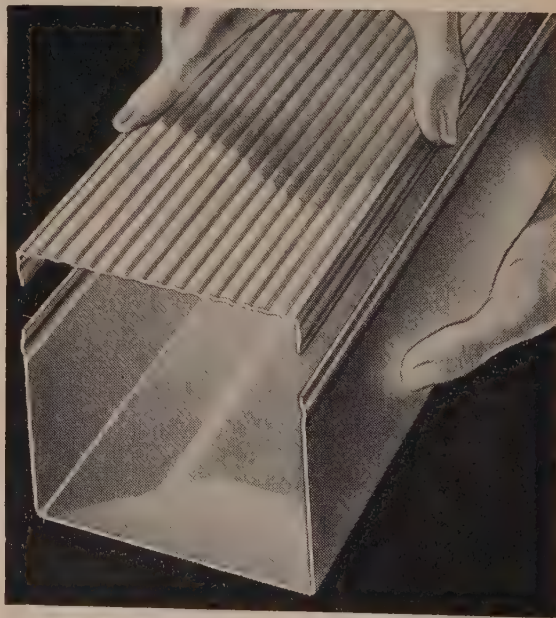
*saves time,
money & trouble*

- * Easier and cheaper to install.
- * Wiring instantly accessible for maintenance.
- * Ideal for power, lighting, telephone and intercommunication systems.

Available in the following sizes :

1" x 1/2", 1" x 1", 2" x 1", 2" x 2", 3" x 2", 3" x 3",
4" x 3" and 4" x 4"

CHANNEL
"Spring Capped"
CONDUIT



Write or telephone for Publication No. RA176

**CHANNEL CONDUITS LTD., STATION ROAD
WINSLOW, BLETCHLEY, BUCKS**
Telephone : Winslow 337

ELECTRICAL REVIEW

6 May 1960

Vol. 166

No. 19

Established 1872

Eliminating Dangerous Appliances

ELECTRICITY is only a minor domestic hazard. Despite the steady growth in consumption, electricity still accounts for less than one per cent of accidental deaths in the home. With a properly designed installation that is efficiently maintained, and appliances of reputable manufacture, the risk of accident in normal circumstances, let alone fatality, is negligible. This is not to say that there is not room for improvement. The good record of the industry in this respect has not come about by chance, and both the supply and manufacturing sides well deserve the tribute which the Molony Committee pays to their concern for safety.

The great majority of fatal accidents are due to "gross misuse, carelessness or inept tinkering." Yet the Committee is probably right not to accept the suggestion that some restriction should be put on the activities of amateur handymen. Though it may be regretted that all installations, modifications and repairs are not carried out by competent electricians, this cannot be insisted upon. It is more realistic to accept, while not encouraging, the growth of "do-it-yourself," and at the same time to ensure that the dangers are appreciated and that accurate information on how the work should be done is easily available. Adequate installations in the first place would remove the need for much extemporising and long trailing flexes, and the committee might here have commended the work of the National Inspection Council.

The Committee's view that "the hazards which may require attention lie more in the appliance and its connection than in the installation" was thus probably influenced by the greater ease with which the problem of dangerous appliances can be dealt with. The new National Approvals Scheme for Domestic Electrical Appliances, though commended, does not meet all the requirements. Inevitably some time must elapse before the benefits of the scheme are felt and its success will depend on the extent to which consumers can be educated to appreciate the benefits of buying only approved appliances. The sale of appliances which fall below the required standards will not be prevented, and there is the danger, already present, that with a rising level of general safety consumers will be more easily taken unawares by the occasional unsafe appliance.

It is therefore difficult to disagree with the Molony Committee that the Home Secretary should be empowered to ban the sale of appliances that are demonstrably dangerous. However one may dislike the spread of regulations and inspection, an irresponsible manufacturer or importer can do great damage to the industry's good reputation. The cases quoted by the Committee clearly call for drastic and speedy action.

The idea of linking the proposed legislation to a comprehensive national

type approvals scheme was rejected not only on grounds of expense but more significantly because "the testing could only relate to hazards already known." The whole point of the Committee's proposals is that they would enable action to be taken in circumstances that had not been foreseen. In the electrical industry, at least, the problem is so small that the mere existence of regulations will probably be sufficient to prevent obviously dangerous appliances being offered for sale. But the legislation will not be easy to formulate and the industry must do what it can to ensure that the powers assumed are not unnecessarily wide.

POWER STATION DESIGN

The first power station in this country to use 100 MW turbo-generator/boiler units operating on the reheat cycle was Ferrybridge "B" near Pontefract in South Yorkshire. This station, which was fully described and illustrated in the *Electrical Review* of 3rd October, 1958, is now complete and last week the official inauguration ceremony took place. The plant which has been installed is interesting for a number of reasons. For instance, the building volume works out at 31 cu ft/kW of plant installed and the overall cost of construction was about £49 per kW.

One of the ways in which these figures have been achieved is by arranging unloading bays with railway tracks between Nos. 1 and 2 and Nos. 2 and 3 machines. This has permitted a reduction in the height of the turbine house, the crane and, consequently, a simplification of the foundations. One cannot help wondering, however, whether overhauls will be as convenient as with a more conventionally arranged turbine room.

Because the three 100 MW machines operate on the reheat cycle the control gear is a little unusual. For example, interceptor valves have been included to prevent the flow of steam into the intermediate pressure cylinder and, as a further protection, unloading valves are provided on the pipework to and from the reheater. The boiler arrangement is also interesting in that the firing face is on the side remote from the turbine room and the flue gases leaving the top of the furnace are first directed inwards, then downwards to the basement and back through horizontal ducts to the air heater.

DAMPING DOWN

After the Chancellor of the Exchequer's clear warning in his Budget speech and the continued rise in bank advances and the hire-purchase debt, the reimposition of a mild credit squeeze was hardly a surprise. The deposit of 20 per cent, with two years to pay, now required for the majority of electrical appliances is lower than the figure applying when the last credit squeeze ended, but 5 per cent more than when it was first imposed in February, 1955. The growth in demand for electrical appliances has tended to level off after the peak achieved last year but if it continues at the present high level the effect of the new restrictions on sales may be small. The main sufferers will be

those shops that have been demanding very small (perhaps unreasonably small) deposits. Exports of domestic appliances have been doing well this year, and a temporary reduction in the pressure of home demand should assist, rather than hinder, manufacturers to achieve the target they set themselves at the B.E.A.M.A. Export Conference.

Though some restriction of credit had clearly become necessary, and the Government have been wise to act in good time, it is disturbing that the brake should have had to be jerked on again in this form so soon after expansion had been initiated. A disadvantage of hire-purchase controls as a method of regulating demand is that the stimulation given to sales when they are lifted is usually much greater than the restriction they exert when they are imposed. There is thus a danger that they may be kept in force longer than necessary.

SATURDAY OPENING

The suggestion was made at a meeting of exhibitors last week that the Electrical Engineers' Exhibition should be closed on the Saturday. Such an arrangement has obvious attractions for those stand attendants who have already spent four gruelling days at the exhibition. Saturday is probably the most tiring and least rewarding day of the whole period. Nevertheless, to accede to this demand would be a mistake. Though there may be few buyers present, the crowds that visit the exhibition on that day have their value to the industry. They include many students and other people of all levels who cannot easily get away from their desks or benches during the week. In fact it is not difficult to find arguments in favour of the exhibition being opened on Saturday to anyone sufficiently interested to attend, just as Continental exhibitions are normally open to the public on Sundays. The industry would benefit from a wider knowledge of its products and operations than is easily obtainable at present.

T.U.C. AND E.T.U.

Its patience exhausted, the General Council of the Trades Union Congress has now told the Electrical Trades Union that it will be suspended from affiliation to the T.U.C. unless it takes one of the alternatives put to it in meeting charges of electoral malpractices: to sue its accusers for libel or agree to an independent inquiry. This is the first direct (as against implied) threat of disaffiliation and the E.T.U. has been given until 18th May to make up its mind.

While the E.T.U. leaders may not be much perturbed at the prospect of disaffiliation, they may, on the other hand, think it unwise to be isolated from the general trade union movement. Moreover, certain complications could arise if the E.T.U. were to be disaffiliated, particularly where the union is one of several concerned in joint industrial councils. On the whole it will be for the general good if the E.T.U. submits to an inquiry and thereby avoids the unpleasant situation which refusal will create.

MECHANICAL HANDLING EQUIPMENT

Electrical Exhibits Prominent at Earls Court



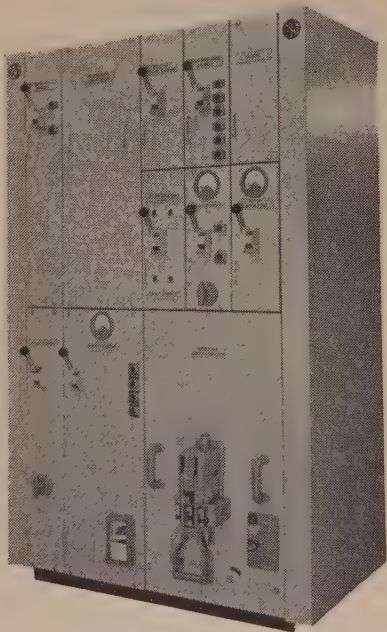
A LARGE selection of machinery used by all branches of industry for moving raw materials and products in the production, storage, transport and utilisation stages is to be seen at the Mechanical Handling Exhibition being held at Earls Court. The exhibition, which is the seventh in the biennial series organised by the Associated Iliffe Press journal *Mechanical Handling*, was opened last Tuesday by the President of the Board of Trade, Mr. Reginald Maudling, and will remain open until 13th May. A floor area of over half-a-million sq ft is covered by the time-, cost- and labour-saving exhibits, many of which are shown under operating conditions, in addition to the outdoor display of larger exhibits in the West Brompton forecourt. A full-scale G.P.O. "Telex" installation is at the disposal of exhibitors and buyers offering direct teleprinter contact with world markets. A daily film programme includes general films on mechanical handling and exhibitors' own films showing their equipment in use.

In addition to being extensive users of many of the devices displayed, the electrical industry is closely associated with mechanical handling. A large proportion of the equipment displayed incorporates electric drives and there are many examples of electrical and electronic control schemes. A number of manufacturers are showing specialised equipment and included among these is a vibrating motor marketed by both the English Electric Co. and the Grantham Electrical Engineering Co. The motors, which are available from $\frac{1}{8}$ to $1\frac{1}{2}$ h.p., can be used wherever a vibrating motion is required, in the drives for conveyor, screening, hopper and continuous drying systems, especially those handling loose material in bulk quantities, and in tamping equipment and machines for breaking or grinding material. Two of these motors are shown on the English Electric stand operating a screen. Also shown by this company are several fractional horsepower motors, including two of the capacitor type and six geared units for use on conveyor drives, and both linear and rotary actuators. One linear actuator is capable of giving a 3,000 lb thrust over a 8.5in stroke in 35 seconds and is suitable for controlling dampers, butterfly valves, furnace doors and gates on conveyor belts. The larger rotary actuator shown can deliver a maximum torque of 150 lb-in through an angle of 180° in 16 seconds and has been designed for use in the nuclear energy field for the remote handling of radioactive materials.

Examples of motors and control gear shown by Associated Electrical Industries, Ltd., include new ranges of squirrel-cage and slip-ring induction motors rated at 80 to 285 h.p. and having Class "E" insulation with a 65°C temperature rise, and a $\frac{1}{4}$ h.p., 1,425 r.p.m. d.c. motor with a solid iron core and poles and redesigned

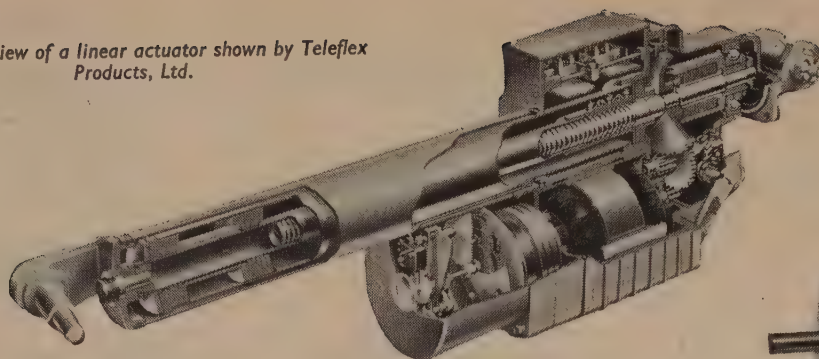
end shields and brush gear. Geared motor units include types with oil-immersed double-reduction straight spur gears in three sizes covering outputs of 1 to $7\frac{1}{2}$ h.p. at speeds of 92-290 r.p.m. and with helical gears for outputs of 1-40 h.p. Control gear exhibits include multi-motor control centres for starting motors up to 250 h.p. and a crane protective panel for duties where the total full-load current does not exceed 100 A. Within the enclosure are an isolator, a transformer, a contactor, overload relays and pilot relay. The panel is equipped with stop button, indicating lamp and reset button and an inspection lamp with 30ft of rubber-insulated cable.

On the C.A.V., Ltd., stand is a representative selection of electrical equipment for fork lift trucks, loaders, cranes and other material handling applications. Included in the exhibits are typical $4\frac{1}{2}$ and 5in diameter d.c. generators for use in 12 and 24 V battery charging systems, and a 7in diameter three-phase alternator for 24 V systems, together with a control board and rectifier. Two starters, a 4.5in diameter coaxial type and a 5in diameter axial type for cranking diesel engines are shown. In the axial starter, engagement with the engine flywheel is effected by a movement of the complete armature, whereas in the coaxial type the pinion alone moves forward to engage with the engine. In both types of starter engagement occurs under reduced power, and full power is applied only after a trip switch is operated by completion of the axial movement. Typical lead-acid and alkaline batteries for

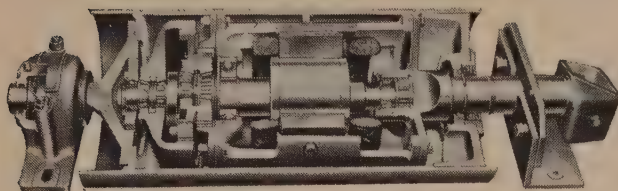


A.E.I. multi-motor control centre

Cut-away view of a linear actuator shown by Teleflex Products, Ltd.



Normand geared motor with auxiliary gearbox



A sectioned "Thorite" motorised drum exhibited by the Richards Structural Steel Co., Ltd.

starting and other purposes and relays and switches for general duties are also exhibited.

A range of geared motors, some incorporating magnetic brakes, with outputs through straight line and right-angle drives of up to 2 h.p. and from 25 to 1,500 lb-ft torque are being shown by the Normand Electrical Co., Ltd. A new auxiliary flange-mounted gearbox for use with the type DS geared motor for giving between two and four extra stages of spur reduction and overall ratios up to 7,000:1 is exhibited. Other items on show include flameproof and battery vehicle motors.

Shown on the Brookhirst Igranix stand is one of a new range of disc brakes, produced for a.c. operation and designed primarily for machine tool and small crane motors. The brake, which is arranged for flange mounting and can be provided with a hand release feature if required, can be incorporated in or immediately adjacent to the actual motor. Other exhibits on this stand include a crane control panel using block contactors and examples from a range of lifting magnets, the largest of which will lift nearly 50 tons.

The electrically powered actuator exhibited by Teleflex Products, Ltd., is basically an electromechanical screw jack incorporating a three-phase, 50 c/s, 400 V motor. The standard stroke is 12 in with a ram speed of 32 in/min and the thrust can be set to any predetermined value between 40 and 4,000 lb. The actuator is stopped and the electrical supply disconnected automatically if the actuator is overloaded. Electromechanical actuators and control equipment are also shown by the Tully Engineering Co., Ltd., a member of the West Group, and one of the main features of the display demonstrates a twin actuator operating a "Lopulco" coal feeder slide valve. The actuator consists of a hollow ram operated by an internal screw thread electrically driven by chain or spur gears. Limit switches control the amount of ram travel and adjustable backlash is provided on the ram to impart a "hammer blow" effect to the actuated mechanisms overcoming any tendency to stick. The maximum static load on the ram is 4,000 lb and the standard units have up to 25 in stroke.

Switch and control gear units and ancillary equipment for an automatic car park being built in the City of London are among the exhibits shown by Sharp Control Gear, Ltd., which also include cam-operated contactor controllers for the operation of cranes, winches, machine tools and battery electric vehicles and a range of limit and foot switches. A.c. and d.c. industrial solenoids which have built-in shock mounting on both the energising and de-energising strokes are also shown. The a.c. series of vertical or horizontal mounting push or pull solenoids covers strokes of from $\frac{1}{8}$ to $\frac{3}{4}$ in and forces from 2 to 50 lb, while the d.c. series of vertical mounting push type solenoids covers strokes up to $\frac{1}{2}$ in and forces up to 45 lb. Both types are for 100 V operation.

A form of control gear is the fluid couplings displayed by Fluidrive Engineering Co., Ltd. These range in size from units for fractional horsepower motors driving conveyors to scoop type couplings driving flywheel generator sets of 2,600 h.p. for mine winders. Working models demonstrate the characteristics of the various types of fluid coupling when driven by squirrel-cage motors. The motor starts under light load conditions and accelerates rapidly to full speed, reducing high-current duration and heating, and if the output shaft of the fluid coupling is stalled the motor current does not exceed twice normal value.

One of the major applications of electric motors in mechanical handling is in the driving of conveyors, and their use in this field is well illustrated. There are, however, a number of compact units specially developed for this application, one of which is the "Thorite" motorised drum shown by the Richards Structural Steel Co., Ltd. The construction of the drum is demonstrated in a sectional model and consists essentially of a three-phase motor ranging from fractional to 20 h.p. and epicyclic reduction gears sealed within the drum shell. The drum contains a quantity of oil which is free to circulate through both the motor and the gears, acting as a lubricant for the working mechanical parts and bearings and as a coolant for the motor, the windings of which are dipped in epoxide resin. Electromagnetic brakes or backstop devices can be fitted and flameproof models are available.

Conveyors

Among the conveyor exhibits is a working model of the baggage handling installation being incorporated in the new P. & O. liner *Canberra*. This installation incor-

porates "The VertiVeyor" preselective vertical conveying system manufactured by J. Collis & Sons, Ltd. The system comprises a vertical chain elevator having a number of carriers into which the loads are automatically metered by an interruptor gear. Where manual feeding is required, a trip switch is incorporated which operates a safety bar protecting the operator's hands and preventing damage to packages. A full-size version of this conveyor is incorporated in a circuit on the stand demonstrating other products of this company, including belt, slat/chain, gravity roller, powered roller and accumulator conveyors, also many types of transfer and multi-directional controls.

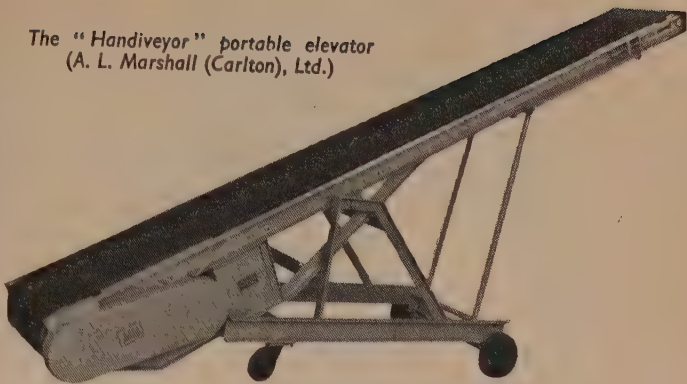
The pneumatic conveying plant, which is the main exhibit on the Thomas Robinson & Son, Ltd., stand, uses electronic control and electrical weighing equipment supplied by Elliott Bros. (London), Ltd. The system, which is used for the bulk handling of powdered and granular products, incorporates a blower which provides the conveying air stream in a small diameter pipeline. The material can be diverted to the required point by two-way valves electrically operated from a remote panel. Batches are weighed in a bin mounted on load cells. In the exhibit the precise weight required can be selected on a panel, the weight being indicated on a dial in the centre of the selector, and an indicator dial gives the weight of each batch.

In addition to a conveyor belt protection and sequence control switch, used in a working exhibit to illustrate belt protection, Hugh Wood & Co., Ltd., are featuring an improved pattern emergency trip wire system. A single concentric pull wire runs the length of the conveyor, containing a conductor carrying a current at 15 V. A pull on the wire giving a deflection of less than 6in is sufficient to break switches connecting adjacent lengths of wire. When the trip wire circuit is broken, a relay is de-energised which opens the associated control circuit contacts and automatically stops the conveyor or machinery motor. The system can only be restarted by a key-operated reset switch in the control panel. If the trip wire should be accidentally short-circuited or connected to earth, a rectifier incorporated at the most remote point of the trip wire circuit is shorted out and the resulting full wave alternating current flowing in the circuit de-energises the relay and automatically stops the motor.

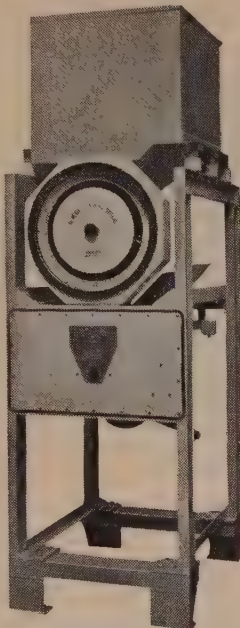
A new lightweight stacker is being shown by the Universal Conveyor Co., Ltd. This portable equipment can discharge unit loads up to a maximum weight of $\frac{3}{4}$ cwt at heights between 3ft 2in and 7ft. The 18in wide rubber belt is driven by a single- or three-phase motor as required. A pushbutton starter is incorporated, and reversing gear is available as an extra if desired. A new-comer to the range of portable conveyors and elevators shown by A. L. Marshall (Carlton), Ltd., is the "Handiveyor" for use in factories and warehouses.

Various forms of feeding machinery for bulk materials are on view. Vibrating feeders are shown on the Locker Industries, Ltd., stand, including a new "Amplitrol" unit which has a drive consisting of an a.c. motor mounted directly in the feeder between two banks of pneumatic springs. An offset weight on the motor shaft produces a small centrifugal force which is amplified by the springs and used to vibrate the trough. Capacity or amplitude changes are made by varying the air pressure in the

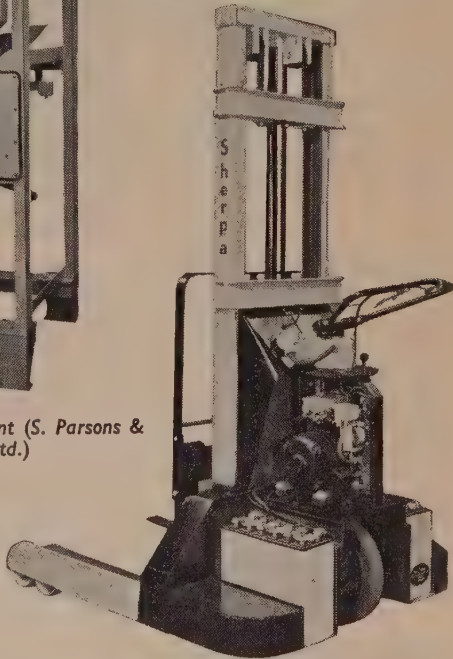
The "Handiveyor" portable elevator
(A. L. Marshall (Carlton), Ltd.)



"Sherpa" pedestrian controlled lifting truck
(Salisbury Precision Engineering)



Weighing equipment (S. Parsons & Co., Ltd.)



springs. Also shown on this stand is the "Con-Wey" constant weight feeder, which is a fully automatic machine for proportioning and blending materials. The unit incorporates a standard electric vibrating feeder which transfers the various materials on to a slow-moving weigh belt. This weighs the material and controls the feed rate of the vibrating feeder. Electric cells are fitted to the scale beam of the machine, which is calibrated to read in lb or kg per linear ft and the machine capacity is calculated by the product of the scale setting and the belt speed. Normally, capacity alterations are made by adjusting the poise weights on the scale beam, but where remote control is necessary a d.c. variable speed motor can be fitted to the weigh belt.

The main display on the joint stand of Winget, Ltd.,

The Coles "Endurance" diesel-electric crane is fitted with electrically operated stabilising jacks



and the Swedish firm of A.B. Vibro Verken consists of four vibratory feeders and conveyors set in the form of a rectangle. This illustrates four of the standard units available and shows an open trough variable feeder, a standard vibratory conveyor of trough section, a combined vibratory conveyor which incorporates a screen for sorting during the material travel and a vibratory transport tube. Other products include a range of external electric "Vibromotors," two vibrating packer tables and a typical vibrating chute.

A working demonstration of various sizes and capacities of "Syntron" feeders forms part of the display on the joint Riley (I.C.) Products, Ltd., and International Combustion Products, Ltd., stand. These include bowl feeders of various sizes to handle small component parts, trough feeders and a spiral type feeder. Also shown on this stand is a "Vacseal" pump which requires no sealing water and is available in a range of sizes to handle all types of abrasive slurries and acids. A unit specially designed for display purposes is shown by S. Parsons & Co., Ltd., to demonstrate how the company's weigh dials can be fitted with electromechanical or mechanical

cut-off devices to control automatically the passage of free-flowing materials for straight discharge or proportional mixing. Other equipment shown by this company includes a weigher situated in a length of overhead conveying track, a dial bench scale fitted with a length of roller conveyor to demonstrate the weighing of passing articles, various types of cut-off devices and a weight recording unit.

Electric Trucks

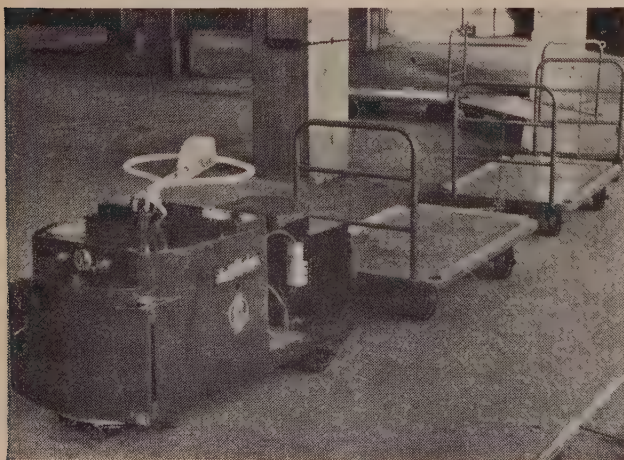
Mechanical handling is not, of course, confined to bulk materials, and a large section of the exhibition is devoted to equipment for moving either large items individually or smaller components in pallet or crate form. Prominent, of course, are electric platform and fork lift trucks. A range of pedestrian- and driver-controlled vehicles is displayed by I.T.D., Ltd., manufacturers of "Stacatruc" fork lift trucks, Clark Equipment vehicles and "Electricar" industrial trucks. Exhibits include a Clark Equipment "Powrworker" stacking truck which has two forward and reverse speeds with interlocked contactors preventing the operator reversing the direction without going through the neutral position.

The centrepiece of the Salisbury Precision Engineering, Ltd., stand is the new self-propelled model 12 "Sherpa" telescopic stacker. This pedestrian-controlled machine is capable of lifting a 15 cwt load to a height of 10ft in 40 seconds. The 1 h.p. motor is supplied from a 24 V battery, and there is a two-speed and reverse gearbox with a hand-operated clutch. The truck can negotiate 1-in-10 slopes with a full load. Mains-operated equipment on this stand includes a telescopic stacker fitted with an automatic drum clamp for 7 cwt loads and a 60in by 27in table which can lift at constant speed to a height of 42in.

New electric trucks are being shown by Coventry Climax Engines, Ltd., including the MSE type of 6,000 lb capacity and the IGEV model for 5,000 lb loads. One of the electric trucks on this stand has been modified to operate in temperatures of about -20°F . Trucks of this type have been supplied for use in cold stores. Electric fork lift trucks incorporating battery chargers are exhibited by Scottish Mechanical Light Industries, Ltd. There are two models for lifting 1,000 and 1,500 lb loads respectively. Both trucks lift to a height of 4ft 9in and have a turning radius of 38in.

A range of lifting and pallet trucks with load capacities from 5 cwt to 5 tons is being shown by Eccles (Birmingham), Ltd. The new 5 cwt series is available with three standard heights of lift, 63, 78 or 102in maximum. The first of these is hand operated, but in the others the hydraulic ram is operated from a separate three-speed pump driven by a 230/250 V single-phase or 400/440 V three-phase motor when supplied from the mains or a 12 V motor in the battery model. The battery model can be fitted with a 230/250 V single-phase input charger capable of giving a slow charge at 1 A and a fast-rate charge at 6 A.

Electric tractors are also being shown by a number of manufacturers, including Jewsbury's Mechanical Handling, Ltd., whose "Express Ameise" electric tractor can tow five tons continuously or eight tons intermittently, and the Brush Electrical Engineering Co., Ltd., whose exhibits include three tractors. The three-wheel S.D. model is capable of pulling loads of up to three tons,



The Conveyancer-E.M.I. driverless tractor

while the type R.D.1 version is capable of handling loads up to 10 tons. The series-wound traction type motor in this tractor has a B.S. rating of 5 h.p. Loads of up to six tons can be pulled by the type T.D. tractor. This is also of three-wheel construction, both the front and the rear pair of wheels being separately driven. Two electric motors are fitted, connected electrically so that the load is distributed equally. Each motor is supplied from its own battery.

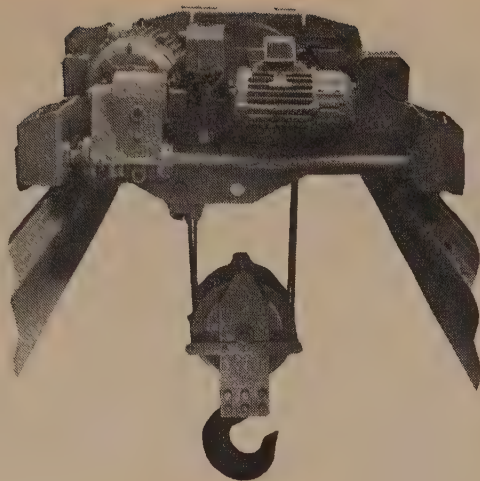
Demonstrated by Conveyancer Fork Trucks, Ltd., is the Conveyancer-E.M.I. "Robotug" driverless tractor system. In this system an a.c. current of approximately $\frac{1}{2}$ A at a specified frequency is passed through wires laid on the surface for temporary routes or embedded in the floor for permanent installations over a desired route. A small voltage induced by the magnetic field produced around the wire in two sensing coils fitted to the front of the tractor is amplified by a two-stage transistor amplifier, rectified and used to operate a relay controlling a servo-motor coupled to the steering mechanism. Each trolley has a control unit into which an operator can programme the necessary instructions to make the trolley call at up to 75 different points for loading or unloading. A system whereby the track is divided into a number of sections has been developed for use where several vehicles are used over a variety of routes. Both tractor and platform type trucks can be supplied fitted with this control system.

Cranes and Hoists

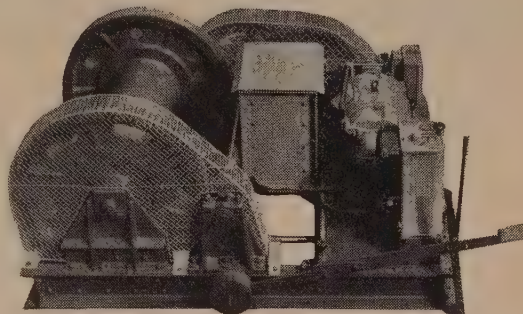
As usual, cranes form some of the largest individual exhibits, and of interest in this category are the range of "Coles" cranes shown by Steel's Engineering Products, Ltd. These embody diesel-electric transmission consisting of a diesel engine on the crane superstructure coupled to a variable voltage generator which provides power for the separate electric motors of the hoist, derrick, slew and travel units. Self-resetting automatic switches prevent hoisting and derricking beyond the permitted limits, electromechanical brakes are automatically and immediately applied if the current supply is interrupted either accidentally or intentionally, and an indicator is fitted which gives audible and visual warning if attempts are made to lift or derrick an unsafe load. If the warning signals are ignored, the hoist and/or derrick motions are automatically stopped. One of the range on display, the "Dominant" crane, is equipped for use with an electromagnet, the model on show being fitted with a 40in, 220 V d.c. magnet. A booster generator is fitted with automatic voltage control, the magnet control gear is installed in the driver's cab and on the jib is a spring-loaded combined cable reeling drum and tag line. Another of the cranes, the "Endurance" model, is equipped with electrically powered stabilising jacks which are operated from the driver's cab.

Diesel-electric drives with separate motors for the hoist, derrick, slew and travel motions are also incorporated in the mobile cranes shown by Ransomes & Rapier, Ltd. One of these, the shop truck crane for loads up to 1.35 tons, has four-wheeled steering to give maximum manoeuvrability.

The main feature on one of the two adjacent stands taken by Herbert Morris, Ltd., is a pushbutton controlled electric overhead crane associated with several swing jib



Matterson double-rail travelling crab



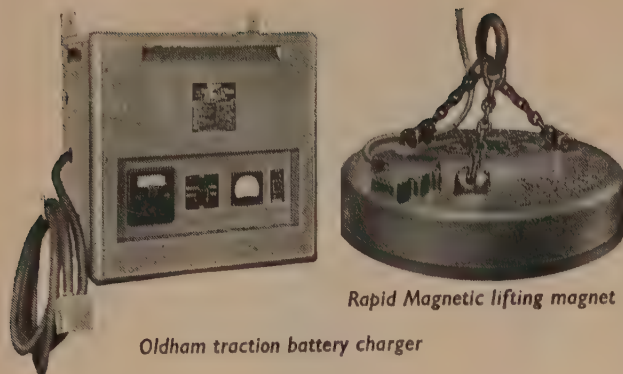
Two-ton winch shown by Butters Bros., Ltd.

cranes each having a different type of hoisting unit, including an electric chain hoist and an electric hoist block. A complete handling scheme is shown in operation on the second stand incorporating an overhead chain conveyor, a gravity conveyor, twin finger tray elevators and a belt humper with automatic loading and discharging features embodied in the conveyor circuit.

An item on display for the first time is the "My-te-Min" Mark II electric chain pulley block shown by Geo. W. King, Ltd. This incorporates electromagnetic disc brakes and pushbutton control. Four models are available with capacities of $\frac{1}{4}$, $\frac{1}{2}$, 1 and $1\frac{1}{2}$ tons. A new 1 ton electric hoist block is also being shown by the Paterson Hughes Engineering Co., Ltd. This totally enclosed hoist provides three hoisting speeds—15, $22\frac{1}{2}$ and 30ft/min—but two-speed motors can be fitted when required. The contactor type controller has pushbutton operation and an electromagnetic brake is fitted.

Their full range of products is being shown by Matterson, Ltd., including wire rope electric hoist blocks, double-rail electric travelling crabs for incorporating on overhead electric travelling cranes and electric screw type jacks. Hoist blocks up to 10 tons capacity are manufactured and the company has recently introduced a double-rail electric travelling crab designed to lift 30 tons up to 24ft at a speed of 12ft/min and travel at 100ft/min on 2in square rails at 66in centres.

The two-ton winch exhibited by Butters Bros. & Co., Ltd., is capable of a lifting speed of 125ft/min and is fitted with a 25 h.p. motor driving through spur gears.



Oldham traction battery charger

Rapid Magnetic lifting magnet

The barrel can accommodate 750ft of rope and the overall dimensions of the winch are: height 3ft 5in, length 8ft 4in and width 6ft 7in.

Magnetic Equipment

A number of lifting magnets for use with cranes and fork lift trucks are to be seen. W. E. Burnand & Son, Ltd., are showing a 40in diameter "Phoenix" magnet designed for use with mobile cranes. This magnet, which with its control gear has a power consumption of 4.92 kW, weighs approximately 1,762 lb and is capable of lifting solid steel ingots or heavy armour plate weighing up to 24,640 lb. Also shown on this stand is one of a range of magnets developed for use with standard fork lift trucks. This 18in diameter unit weighs 204 lb and can lift billets or slabs up to 5,600 lb. The range covers magnets from 12 to 20in diameters weighing from 1 to 2 cwt and capable of lifting from 2,000 to 10,000 lb. The magnets have a power consumption of from 250 to 500 W at voltages ranging from 12 to 64 to coincide with the existing truck battery unit.

Rapid Magnetic, Ltd., are also showing lightweight lifting magnets incorporating aluminium windings for use on fork lift trucks. Other exhibits on this stand include a clover leaf magnet for handling coiled steel strip, magnetic elevators and conveyors, a range of permanent magnet concave rolls for tube or pipe handling during manufacture and galvanising or plating, and magnetic clutches, brakes and separators.

An automatically controlled lifting magnet can be seen handling steel plates and scrap material on the stand of Electromagnets, Ltd. A static exhibit on this stand is the "Boxmag" packaged unit display which includes all the components necessary for converting mobile cranes for magnet operation. The company is also showing an inclined conveyor embodying a magnetic conveyor head unit and fitted with an overband type magnetic separator. The drive from the conveyor motor is transmitted through one of the company's magnetic clutches, and material is being transferred to the conveyor from a vibratory feeder exhibited by their associates, the Blending Machine Co., Ltd.

An electromagnetic coupling in which the torque is transmitted through a ferrous powder which, when energised, links an inner and outer rotor so that a solid drive is achieved without slip is shown by S. Smith & Son (England), Ltd. The torque is a direct function of and is accurately controlled by the value of the exciting current and is entirely independent of speed. If the torque for a given excitation is exceeded, slip will take

place, providing a safety feature against overload and a characteristic which can be used, with certain limitations, of heat dissipation, in tensioning devices. Models ranging from $\frac{1}{2}$ to 211 lb-ft torque capacity are available.

A range of 13 magnetic clutches and brakes covering powers from fractional up to 45 h.p. developed for use in the gearboxes of machine tools are being shown by Crofts (Engineers), Ltd. This company is also showing a range of stationary field magnetic instrument clutches which are made in five sizes transmitting torques from 4.2 up to 420 oz-in at speeds up to 20,000 r.p.m.

Batteries

The use made of portable electrically powered apparatus in the mechanical handling field is emphasised by the number of stands devoted to batteries and battery chargers. Chloride Batteries, Ltd., are showing traction batteries in which the positive plate is held in a multi-tubular "gauntlet" of resin-impregnated "Terylene" cloth, while the D.P. Battery Co., Ltd., are featuring a range of cells from 42 to 1,330 Ah capacity. Included in these is the new "N" range of cells which are designed for heavy duty applications where the highest possible capacity is required in a limited space.

Alkaline traction batteries of both the nickel-cadmium and the tubular positive plate nickel-iron types are being displayed by Nife Batteries. Both types have high discharge rates and can be fully recharged within seven hours.

In addition to a range of traction battery cells, Oldham & Son, Ltd., are introducing a new charger for traction batteries. Both taper and two-stage chargers are available, with characteristics meeting the requirements of B.S. 2550. A single-phase supply is fed via a double-wound vacuum-impregnated transformer with earth screen and six primary tappings to a set of germanium rectifiers. Protection on the a.c. side is afforded by a high-speed circuit-breaker and a high-speed fuse is incorporated in the d.c. output. The charge is terminated in both versions by an M.J.V. relay which is also used in the two-stage model to operate the contactor for changing the charging rate.

A range of automatically controlled charging equipment using selenium, germanium or silicon rectifiers to suit various loadings is being displayed by Legg (Industries), Ltd. One of the models shown is a recently introduced two-step charger for maintaining 20 lead-acid cells, having a starting rate of 90 A.

Miscellaneous

The exhibition includes numerous other examples of electrical interest which do not come within the above broad categories. These include an instrument using magnetic principles to detect flaws in steel wire rope shown by the British Ropeway Engineering Co., Ltd., a new two-speed electric drill demonstrated by the Rawlplug Co., Ltd., an electrically-operated bag stitching and opening machine displayed by the Thames Packaging Equipment Co., a model of the reactor fuel handling equipment for the Bradwell nuclear power station on the Strachan & Henshaw, Ltd., stand, finned tubes for reactor fuel element cans shown by Accles & Pollock, Ltd., and electro-plating techniques exhibited by the Ionic Plating Co., Ltd.



The Shaw discharge lamp development laboratory; life testing of fluorescent tubes is done on the equipment seen in the left foreground

Discharge Lamp Progress

Linking Development and Production

THE lamp-making activities of the General Electric Co., Ltd., are conducted in three principal establishments: general lighting service lamps are produced at Wembley, Middlesex; small lamps, such as automobile bulbs, are made at the Newcastle factory; and the discharge lamp production is centred at Shaw, near Manchester.

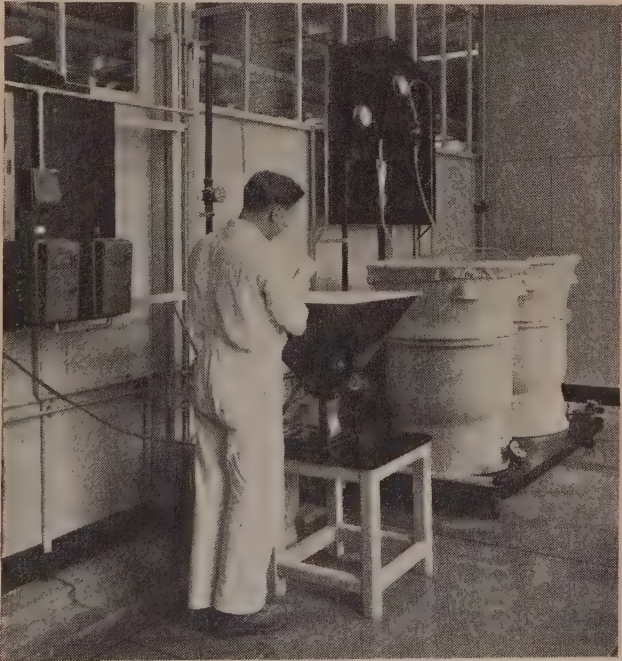
It is the company's policy to carry out basic and "long-term" research at its separate Wembley laboratories, while dealing with development and immediate problems at the point of production. Last week we were able to see how the policy is applied at the Shaw factories. These are two converted cotton mills—the "Cape" and the "Duke"—well-constructed four-floor buildings with a total floor area of over a third of a million square feet, in which more than a thousand people are employed. The workers are mainly women who have inherited a tradition of factory work and have proved very adaptable to the newer industries.

The manufacture of valves and cathode-ray tubes for radar was carried out at the works during the war, but this was afterwards replaced by discharge lamp production; the manufacture of fluorescent tubes began in 1948 and in the past five years the rest of the "Osram" range of discharge lamps have been produced at Shaw. It is claimed that the factories now form the largest discharge lamp manufacturing unit in the United Kingdom.

As will be seen from the illustration, the discharge lamp development laboratory at Shaw is very spacious. It has made a number of important contributions to the advance of the art, a few of which we propose to mention.

In the operation of fluorescent tubes phosphor size is

of importance and a method has been devised for classifying the particles and removing the unwanted ultra-fine constituent. After grinding, the powder is passed, suspended in water, to a "cyclone" unit which throws the larger particles outwards so that they drain down and



Two-stage classification equipment for separating out the most suitable phosphor particles in "cyclone" apparatus after grinding in a mill (being loaded)



This rotary pump for mercury vapour lamps can handle 24 lamps at a time; the correct amount of mercury is introduced automatically



Automatic pumping, baking and filling is achieved with this equipment in the final stages of sodium lamp production

These colour-corrected mercury fluorescent lamps, with integral internal reflectors, are receiving their phosphor coating



leave through an orifice at the bottom for regrinding. Particles of less than 20 microns are forced upwards into a vertical tube at the top of the cyclone unit and pass to a second unit. Here they are further classified; those between 2 and 20 microns are drained off for use and the finer ones go to waste.

The adoption of water suspension for the particles has made it necessary to substitute water soluble binders for the organic solvents used with the former dry-milling process in preparing the phosphor coating suspension. To overcome the drying problem thus raised a conveyor system has been installed in which 4ft and 5ft coated tubes are arranged vertically and during their travel receive puffs of warm air before being passed through a baking oven. It is claimed that the constant quality control checks which are made at every stage have done away with the need for "ageing."

Other fluorescent lamp work now in progress includes the redesign of cathodes to enable them to withstand vibration when used in transport systems. Many existing designs resonate at around 90 c/s; the aim is to produce cathodes which have no major resonances below 200 c/s. Colour research has resulted in the blending of phosphors to give "a bright fresh atmosphere" with good rendering of red. This is used in the company's new "Deluxe Natural" tube.

A tendency of street-lighting authorities to favour sodium-vapour lamps has encouraged development work in this direction. One of the high-wattage lamps introduced by the company a year or so ago was the 280 W integral type. Since its introduction design improvements have resulted in a 30 per cent increase in efficiency without reduction of life.

A luminous efficiency of 100 lumens/watt has been achieved in the linear sodium lamp, but theoretically an efficiency of 400 l/W is possible, giving scope for much further research. To assist in achieving the aim of more compact lamps and lanterns a reflector sodium lamp has been developed.

Work is in progress on the formulation of glasses which will resist sodium vapour attack, and at the same time arc-tube shape is being investigated with a view to devising means of ensuring the continued even distribution of the vapour.

The need to increase the output of sodium lamps is resulting in the mechanisation of processes which previously were the preserve of highly-skilled operators. A machine for the U-bending of sodium lamp tubes has an output equal to that of three or four operators whose training was spread over four to six months.

New automatic pumps, which are now undergoing trials, will perform a complicated series of processes upon being pushbutton started. Five of these pumps can be attended to by only two operators whereas at present twelve operators are needed to obtain an equivalent output.

Another new machine in the development stage is for sealing the inner assemblies of integral sodium lamps to their outer envelopes. To achieve a high degree of vacuum "getter" is fired by a time-controlled eddy-current heating set.

Work on mercury vapour discharge lamps has been mainly in the realm of colour correction and mechanisation of production. Recent introductions have included a reflector lamp, a 700 W model of which is now on the

way. This will be a useful size between the 400 W and 1,000 W lamps already available.

Highly-specialised operations and techniques have been involved in the mechanisation of the manufacture of m.v. lamps, largely on account of the high temperatures (above 2,000°C) at which the transparent silica arc tube has to be worked.

The Shaw factory now has eight modern quartz-pinching machines for sealing in the lamp electrodes at an average rate of 30 an hour.

To replace the "bench-pump" method of exhausting lamps a 24-head rotary pump for 80 W and 125 W lamps has been developed. This will initially be capable of dealing with from 100 to 120 lamps an hour, but this rate is expected to rise. Similar pumps are being planned for low-wattage and 250 W and 400 W lamps. In this

equipment there is an automatic "dosing" arrangement, individual ovens travelling with the lamps, and compression heads.

With its own equipment for electrical, photometric and other measurements, the development laboratory at Shaw operates largely as a self-contained unit, but it can call upon the analytical group at the G.E.C. Research Laboratories at Wembley for help in the more special techniques, such as electron microscopy and interferometry analyses.

The Shaw laboratory also makes highly-specialised light sources for spectroscopic work, the most important example being lamps containing the 198 isotope of mercury which, we were told, costs £5 million per pound and is used in quarter-milligram quantities to provide a light source for high-resolution interferometry.

PROTECTION OF CONSUMERS

Molony Committee Proposals

A RECOMMENDATION that there should be early legislation to enable the Home Secretary to make regulations prohibiting the sale of goods that present undue risk of personal injury is made in the "Interim Report of the Committee on Consumer Protection" (Cmd. 1011, H.M. Stationery Office, price 1s). It proposes that the new powers should be used in respect of the colouring of the connecting wires of electrical apparatus, and it suggests that there may be a case for action in relation to the insulation and enclosure of live parts of electrical appliances; to the labelling of electric blankets; and to electric toys and their transformers.

"Our proposals," says the report, "represent the imposition of requirements no more onerous than would be readily acceptable by the large majority of manufacturers; the effect of their imposition would be to curb the irresponsibility of the few. It is our view that statutory power to deal with dangerous situations should exist in advance of the demonstrable need, so as to permit prompt and firm action as soon as the need is manifest. We recognise that in many cases practical difficulties will arise in the precise identification of the root cause of the danger and in devising the best means of removing it, all of which must take time. The existence of a power to prohibit the sale of unsafe goods and to enforce remedial measures would, we believe, markedly accelerate these processes, and might in some cases render statutory intervention unnecessary in the final event."

The legislation the Committee envisage would empower the Home Secretary to prohibit by means of regulations the sale or hire of goods, or the offering or exposure or having in possession for sale or hire, any goods that did not comply with the regulations' requirements on such points as composition, design, construction, performance and labelling.

As the occasion arose the Minister would turn to the British Standards Institution, the Department of Scientific and Industrial Research and other sources of expert guid-

ance to enable him to exercise his powers to the best advantage. Enforcement should be the duty of the local authorities, and there should be substantial penalties for offences against the regulations.

The Committee, under the chairmanship of Mr. J. T. Molony, Q.C., were appointed last summer. From their broad terms of reference they decided to confine their inquiry to "articles which appeared to us to involve undue risk of personal injury either because in ordinary use they contain or develop a concealed danger, or because they expose persons to danger in the event of such ignorant or inadvertent mishandling as may be reasonably anticipated."

No evidence was found to suggest the marketing on any widespread scale of consumer goods from which recognised hazards had not been eliminated so far as was reasonably practicable. On the contrary, manufacturers in general are said to have "a high sense of responsibility and safety-consciousness"; the few exceptions were attributable rather to ignorance or oversight than to culpable negligence.

Electrical Appliances

The specific items covered in the report are electrical appliances and fittings; space heating appliances; flammable clothing materials; toys; and toxic and corrosive substances in domestic use. The Committee say that they learn from a detailed analysis of fatal accidents in the home which have involved electrical appliances and fittings that the outstanding causes have been "gross misuse, carelessness or inexperienced tinkering." The only remedy is greater care by the user and better education in safety matters.

The Committee do not consider that the statistics of domestic fatalities justify measures, such as had been suggested to them, that would interfere with the operations of the "careful and intelligent" handyman in carrying out repairs or modifications to his household

installation. The hazards that may require attention lie more in the appliance and its connection than in the installation.

They express deep concern at the sale of imported appliances equipped with connecting wires not coloured in accordance with the accepted British code, and believe that there is an urgent need for a prohibition of the sale of equipment which creates a risk of such confusion. Although presented with conflicting evidence, the Committee are not satisfied that the operation of an electric blanket at low voltage through a transformer provides any answer to the fire hazard; they were led to believe that a thermostatic control that would provide an effective safeguard is not practicable at a price that a customer would be willing to pay. They think the existing British Standard represents as much protection in design as an undoubtedly difficult technical problem presents, and if blankets should be marketed that fell below these requirements there would be cause for appreciable concern.

The Committee also suggest there is a case for the enforcement of minimum standards in low-priced small appliances, such as toasters and fires, where live parts are unduly accessible and the insulation is liable to be cut by sharp edges.

Industry's Safety Record

Nevertheless, as the Committee point out, electrocutions account for less than one per cent of the accidental deaths in the home, and the supply industry and British manufacturers have shown a jealous concern for the safety of their products. The suggestions for firmer intervention than a voluntary system (such as the National Approvals Scheme for Domestic Electrical Appliances) are not intended as criticism of the excellent work and self-discipline of the industry as a whole. "Our aim, on the contrary, is to ensure that what has been achieved in terms of public safety and confidence by the responsible majority should not be sapped by the occasional dereliction of a small minority, or by an irresponsible importer."

It is recognised by the Committee that complete standardisation of domestic plugs and sockets would not only add greatly to the householder's convenience, but by enabling manufacturers to supply their appliances with suitable plugs correctly and permanently attached would also contribute to his safety by eliminating the risk of an incorrect connection. There is a case for requiring electrical toys to be operated only at low voltage, and where this involves a transformer its safety and durability might require regulation.

In its evidence to the Molony Committee, the British Electrical and Allied Manufacturers' Association stressed the dangers of amateur wiring installations and pointed out that more socket-outlets, installed by competent contractors, would remove the dangers of long flexible leads trailing across living rooms. In addition to their sense of public responsibility British manufacturers had a "vested interest" in safety and were eager to take all possible steps to maintain it. They had played a leading part in negotiations resulting in the establishment of the new British Electrical Approvals Board for domestic appliances.

Another subject of discussion with the Committee was the possible danger from the varying colour codes for flexible leads employed by manufacturers in different

countries to distinguish live, neutral and earth connections. The B.E.A.M.A. attached great importance to international safety standards and, with the British Standards Institution, was already playing a leading part in securing greater co-operation among manufacturers in Western Europe on matters of this kind.

ELECTRICAL ENGINEERS' EXHIBITION

SOME fifty of the exhibitors at this year's Electrical Engineers' Exhibition attended a meeting in London last week convened by the Exhibitors' Consultative Committee. After an account from the chairman, Mr. W. P. McGeoch, of the past year's work, the names were announced of the thirty firms which were successful in the ballot held at the exhibition and whose representatives will form the new committee; 199 valid ballot papers were received. The aim is to have a committee that is more representative of exhibitors than the old one, which was closely linked to the B.E.A.M.A. Publicity Committee. Nevertheless, several speakers felt strongly that the larger firms still dominated the Committee and it was agreed that ways of ensuring that more smaller firms were elected should be studied.

Stand allocation and the problems of exhibitors who were on the balcony were discussed at length, and it was suggested that in considering the pros and cons of sectionalisation greater attention should be paid to the convenience it would afford to visitors. There was some support for a suggestion that the exhibition should be closed on the Saturday but the reasons against this were effectively put by Mr. McGeoch. (See comment page 852.) Several perennial questions such as catering, cleanliness and facilities for stand attendants were also raised, and in conclusion there seemed to be general support for the view that an exhibitors' meeting organised by the Committee should take the place of that convened by the exhibition organisers.

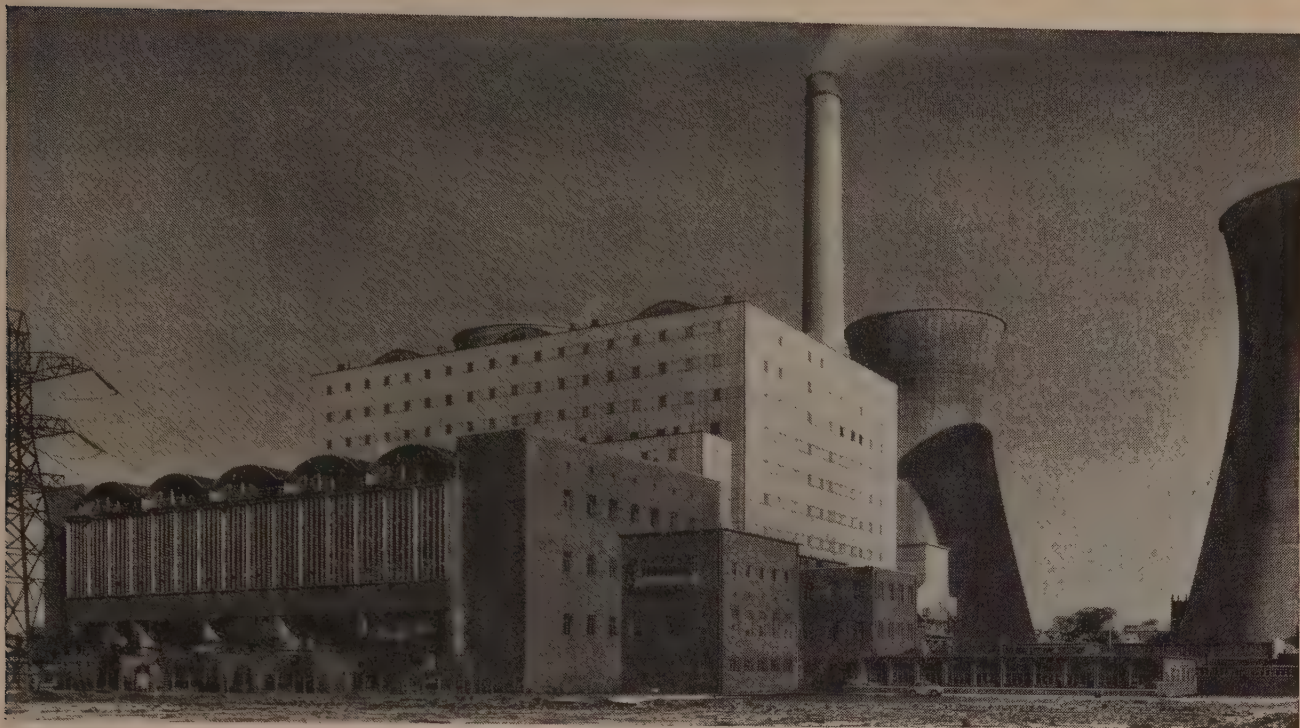
Because the Committee will be independent of the B.E.A.M.A. it will require funds to pay for accommodation and secretarial help. It was agreed at the meeting that this should be raised by an annual subscription of £1 from firms occupying stands of more than 600 sq ft and 10s from firms occupying stands of 600 sq ft or less.

Fuel Institute Luncheon

THE annual luncheon of the Institute of Fuel was held last week at the Connaught Rooms, London. The Institute's president, Dr. A. C. Monkhouse, was in the chair and the principal guest and speaker was the Minister of Power, Mr. Richard Wood. The proceedings began with the presentation of the Student's Medal and Prize to Mr. G. E. Oatley, awarded for his paper "A Study of the Mechanism of the Modification of the Bulk Density of the System Coal-Oil-Water," and of the Bone-Wheeler Medal to Dr. R. H. Essenhigh for his paper "The Burning Times of Coal Particles in a Pulverised Fuel Furnace."

The chairman then introduced Mr. Wood, referring to the increasing strength of the Institute, which drew its members from many fields and countries. The Minister, in his brief speech, said that he had been impressed by the inventiveness of the exhibitors at the Fuel Efficiency Exhibition, but he felt that there still seemed to be scope for the further development of fuel-saving appliances.

Ferrybridge 'B'



LAST Friday Mr. E. S. Booth (member, Central Electricity Generating Board) officially opened the Ferrybridge "B" generating station in the Yorkshire Division. This 300 MW station was the first in the country to employ 100 MW turbo-alternator/boiler units operating on the reheat cycle and was described in detail during the constructional stage (see *Electrical Review*, 3rd October, 1958). Some further details of the plant design may, however, be of interest now that work has been completed and the plant is in full operation.

The completed station accommodates two Stirling single-drum radiant reheat type natural circulation boilers, each with a maximum continuous rating of 760 klb/hr at 1,600 p.s.i. and 985°F with reheat from the turbine h.p. cylinder exhaust to 955°F at 432 p.s.i., and one Babcock & Wilcox radiant type boiler. The final feed temperature at m.c.r. is 435°F.

Three 100 MW, 3,000 r.p.m. C. A. Parsons turbo-alternators, each with its own condensing and feed heating plant, are installed. The turbines are of three-cylinder design and with the exception of a two-row velocity wheel on the h.p. shaft they are fitted with reaction blading throughout. There are ten reaction stages as well as two impulse stages in the h.p. cylinder. After passing through the h.p. cylinder steam returns to the boiler for reheating before entering the i.p. cylinder. About two-thirds of the exhaust from the i.p. cylinder after seventeen stages of expansion is transferred by an overhead pipe to the centre belt of the balanced double-exhaust l.p. cylinder. The balance passes through eleven more stages in the i.p. casing to the condenser.

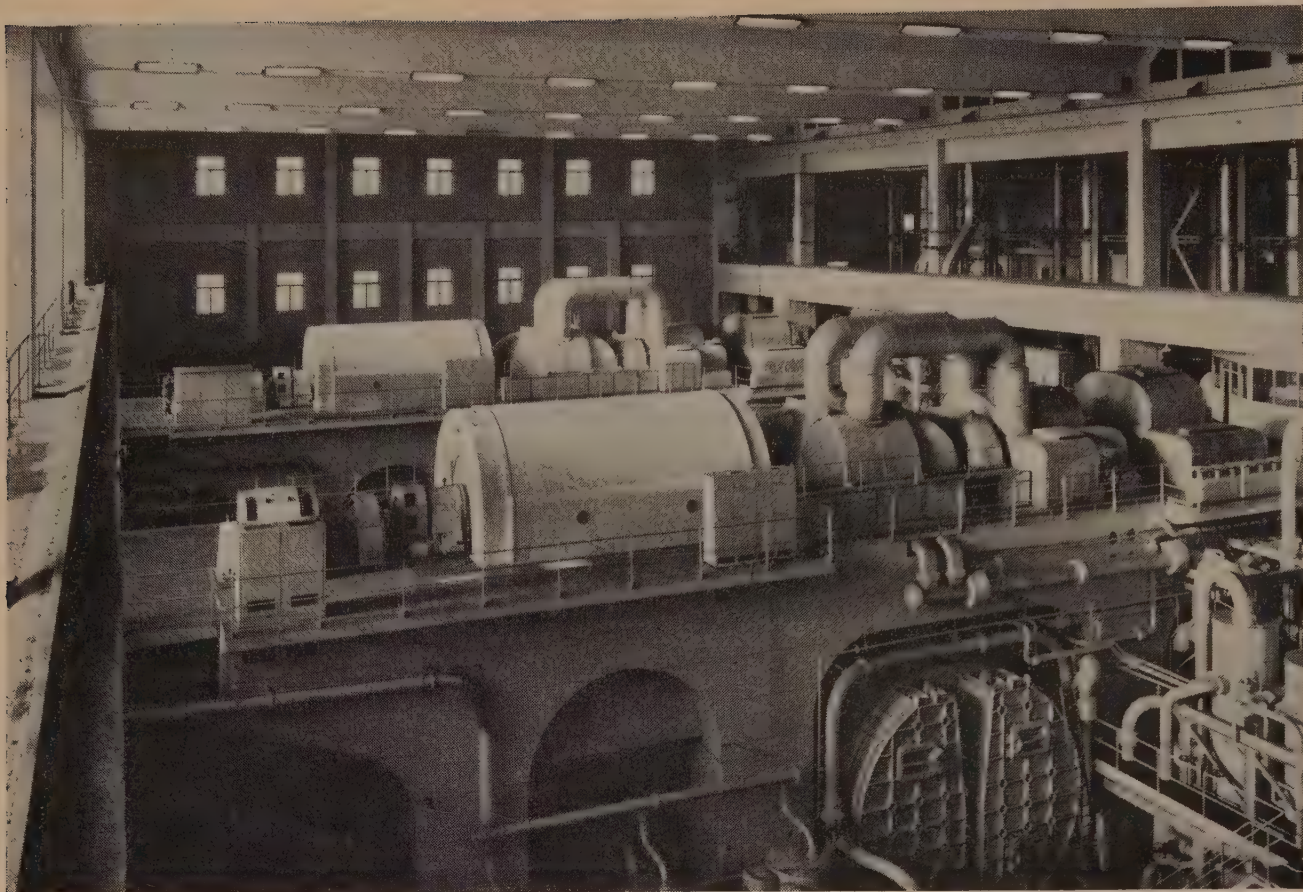
The two-flow l.p. cylinder has eight stages in each flow.

The stop valve steam conditions of the turbine are 1,500 p.s.i. and 975°F. Steam is reheated to 955°F at 432 p.s.i. The h.p. rotor has an adjustable thrust bearing by means of which the blading clearance can be increased during starting up. The i.p. thrust bearing is fixed and the h.p. and l.p. rotors are connected by a sliding coupling. The couplings between the l.p. and i.p. and alternator rotors are solid, the l.p. thrust bearing locating all three rotors.

The blading of the machine is novel in that there are three exhaust outlets to the single regenerative condenser. As already mentioned, there is an l.p. section incorporated in the i.p. turbine in addition to the normal double-flow l.p. turbine. The steam flowing through the blading in the reaction turbine exerts considerable pressure on the moving blades in the direction of its flow. To resist this pressure, dummy pistons are attached to the inlet end of the rotor against which the inlet steam pressure exerts a counterbalancing thrust on the blading. There is one dummy piston on the h.p. spindle and two on the i.p. The double-flow l.p. turbine is, of course, self-balancing.

The governing gear on the machines is operated solely by means of oil pressure. The control gear is complicated by the fact that the turbines operate on a reheat cycle. It is therefore necessary to include interceptor valves to prevent the flow of steam into the i.p. cylinder and as a further protection unloading valves are provided on the pipework from the reheater to release the steam contained within the reheater and pipework to atmosphere.

Steam for feed heating is bled from the turbine at six points. The first three stages are l.p. heaters, the third being a direct contact high-level de-aerator heater. The last three stages are h.p. heaters.



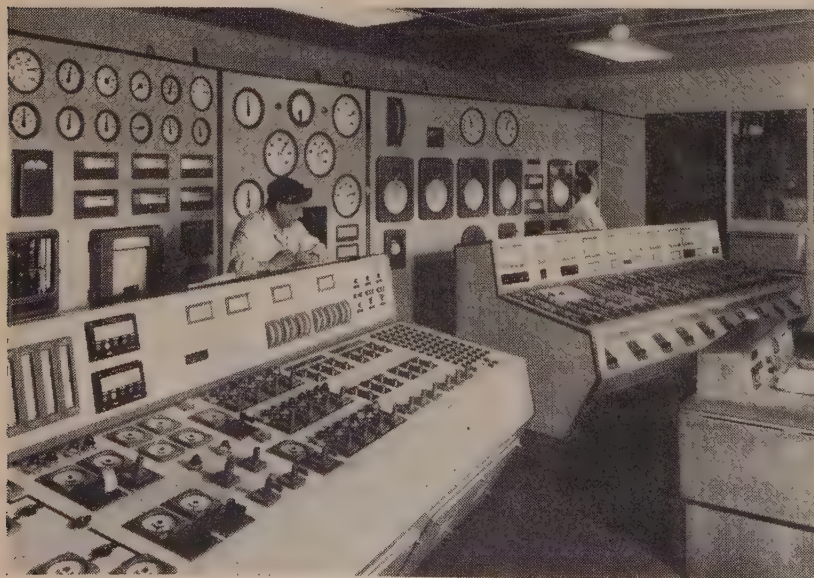
General view of the turbine room showing two of the 100 MW Parsons reheat turbo-alternator sets

From the three exhaust outlets steam passes into the condenser which has a total surface area of 75,000 sq ft. The condenser is designed to give a vacuum of 28.9 in Hg at m.c.r. when it is supplied with 64,000 gal/min of cooling water at 60°F. Condensate is extracted from the condensers by two 100 per cent duty 680,000 lb/hr extraction pumps; air is removed from the condensers by three 50 per cent duty 227 lb/hr rotary Le Blanc type

motor-driven air pumps and a separate motor-driven quick-start exhaustor is also provided. The extraction pumps discharge through the l.p. heaters to the de-aerator storage tank which provides the suction of the two 100 per cent duty Harland booster feed pumps supplied for each unit. The booster pumps, each of which is driven by a 800 h.p., 1,470 r.p.m., 6.6 kV water-cooled motor of Harland manufacture, are capable of delivering 850,000 lb/hr of water at 540 p.s.i. through the l.p. heaters to the suctions of the two 100 per cent duty Harland feed pumps. The feed pumps are driven by 2,650 h.p., 2,980 r.p.m., 6.6 kV water-cooled Harland motors and are rated for 850,000 lb/hr of water at 1,960 p.s.i.

Each alternator generates at 13.8 kV and is rated at 100 MW at 0.8 power factor when operating at a hydrogen pressure of 0.5 p.s.i. Each unit is provided with automatic voltage regulators of the Metrovick normally inactive type, capable of keeping the generator terminal voltage within ± 1 per cent of the controlled value over the whole load range of the generator.

The design and construction of the station have been carried out by the C.E.G.B. Northern Project Office, with Messrs. Mott, Hay & Anderson as civil engineering consultants, and the architects were Messrs. Watson & Coates.



No. 2 unit control room showing miniaturised controls

VIEWS on the NEWS

By REFLECTOR

A REMARK made by Mr. O. W. Humphreys at last year's British Electrical Power Convention led to a discussion of the desirability or otherwise of relying entirely on artificial light in factories and commercial establishments. The question came up again last week at a meeting in London, sponsored by the British Lighting Council, when Mr. Alister MacDonald contended that the level of natural daylight now being aimed at was impossible to achieve with the weather we experienced in this country. It was now feasible to obtain, by a combination of natural and artificial lighting, a stable level of illumination. A compromise of this sort was also advocated by Sir Thomas Bennett. Mr. H. C. Weston, however, seemed to think that stabilisation was undesirable and suggested that artificial light should be arranged to vary as natural light did. But surely that would merely take us back to where we were!

* * *

The good work done by Consultative Councils in smoothing out possible causes of friction is well illustrated by an item in a report I have just seen of representations dealt with by a District Committee of one of these bodies. A consumer who had objected to the impact of the Board's standard installed load tariff was interviewed by a member of the Committee and an officer of the Board. As a result, the consumer

"on being informed of the structure of the tariff and the characteristics of the industry underlying the tariff, had withdrawn his complaint—furthermore, he had volunteered information of additions to his installation and agreed to a quarterly standing charge in excess of that to which he had originally taken exception."

The arguments put forward must have been very convincing. I wonder, however, whether the consumer in another case was equally amenable to reason? Having had his supply disconnected for not paying his bill, he deducted 1s 4d from the next account to cover the fixed charge for the five days before it was reconnected, and apparently considered this to be quite legitimate.

* * *

A few weeks ago I referred to a Bill before Parliament which is designed to regulate caravan sites, one feature being provision for permanent sites. I suggested that the Electricity Boards should be prepared to provide supplies to these sites. The Eastern Electricity Board is already active in this field (to use an apt term). At Clacton it has been supplying one camp for some years and now it is erecting new overhead distributors to supply a further 200 caravans and also provide water heating in a new toilet block. At another site in the same town

mains are being put in to supply 50 caravans and a toilet block and similar work is being done at Walton-on-Naze, Suffolk.

* * *

Because I recently commended a British hotel for providing electric blankets time-operated centrally (as a substitute for hot water bottles) a Montreal reader describes me as being smug. He seems to think that this is the only form of heating used in the hotel for he sarcastically says:—

"Of course, if one is cold during the day, just wrap the blanket around yourself and relax, mind you, it isn't an electric blanket during the day, but that's a detail."

I am willing to agree that the general standard of hotel comfort (or at least heating) is probably higher in North America than in this country but there are establishments here that compare quite favourably with their transatlantic counterparts.

* * *

It seems a little optimistic, in this climate, for an inventor to tell the *Sunday Pictorial* that he intends to run a new three-bedroomed bungalow "entirely on sunshine" which he will collect by using "ordinary silver paper on huge U-shaped mirrors under a glass roof." His idea is to focus the sun's rays on to boilers which will produce steam for driving an engine which, in turn, will drive a dynamo. He has brought his device to the notice of the Department of Scientific and Industrial Research which, he says, has "agreed to ask its scientific experts to investigate his proposals." He seems to think that finance is his main problem. I can see others.

* * *

Seventy years ago the *Electrical Review* (9th May, 1890) published the following strange note from New York:—

"The Edison Electric Company has been served with the papers in a suit brought against it by the Ganz Electric Company of Buda Pest, damages being laid at half a million of dollars. The Ganz Company owns the patent of the alternate electric system, and it maintains that Mr. Edison, President of the Edison Electric Company, used influence with the Legislature of New York State, and induced them to adopt the alternate electric system for the execution of criminals, thereby prejudicing the public against the Ganz electric system. It was necessarily demonstrated that the Ganz system was sufficiently powerful to kill instantly, and ordinary consumers of electric light have in consequence become alarmed and prejudiced against it."

E.R.A. Annual Report

THE 39th annual report of the British Electrical and Allied Industries Research Association (E.R.A.) covering the year 1959 was published last week. The Council believe that the greatest satisfaction of members arises from research or development which solves some pressing problem. This probably explains why the distribution of the Association's income has changed so much in the last ten years. Subscriptions have fallen from 53 to 43 per cent while income specially subscribed for particular researches has increased from 14 to 36 per cent. The Association had an increase of about 6 per cent in total income during the year, but this was more than offset by an increase of about 8 per cent in total expenditure. The increase in income was made up of about £7,000 from membership subscriptions and £40,000 from other sources, mostly special supported researches. Expenditure for the year was £498,914 and of the 8 per cent increase in expenditure over 1958, 7 per cent was attributable to direct research and the remainder to general administration and member services. The Council considers that the pressure for co-operative research still somewhat exceeds members' willingness to pay for it. There was a larger influx of new members, but this was to some extent offset by industrial amalgamations which generally led to a reduction in subscriptions.

The use which members make of the Association varies considerably. Some rely on technical reports as their source of information, some are able to add to this by contacts which arise from committee meetings, and yet others send members of their staff to visit the E.R.A. laboratories to discuss the progress of research and consult the staff about their own problems. Special consultation is becoming an increasingly important aspect of Association work.

Cables

Part of the annual report deals briefly with some research achievements of the Association. The field investigation of the effects of seasonal characteristics of soil on the permissible ratings of buried cables has been continued. The investigation of the factors influencing the short-circuit ratings of copper conductor paper-insulated lead-sheathed cables for voltages up to 11 kV is now complete. A report will be issued shortly giving the procedure for calculating the short-circuit rating of such cables. An investigation has been started to determine the factors which influence the short-circuit rating of p.v.c.-insulated cables and joints. Further tests have been made on mineral-insulated cables in buildings to establish short-circuit ratings.

Research on oxidation of transformer oil has resulted in the discovery that one of the three main fractions of the oil is more easily oxidised than the others and indeed catalyses the oxidation of the other fractions.

New standard testing methods have been recommended for determining the resistance of insulating materials to discharges. Electron bombardment from sharp-point electrodes produces microscopic bubbles in liquid or liquid-impregnated insulation. These have an influence

on breakdown strength and their shape and stability in strong fields conform to mathematical analysis. Work done for the Ministry of Aviation on thermal and electrical degradation of moulded plastics has been made available to members. The automatic tracking comparator developed by the Association is now in production.

Circuit-Breakers

This year the work on oil-blast circuit-breakers has been recommenced after a lapse due to shortage of staff. At this stage the two main objectives are to trace with some degree of precision the location and movement of the arc column during the arcing period when it is generating pressure by vaporisation of the oil and where re-ignition takes place after a current zero.

Initial tests have been made of the effect of preheating on the pre-arcing times of fuses to ascertain to what extent this may influence discrimination. Investigations have now shown that some makes of h.v. fuse have difficulty in interrupting small overcurrents, and work of a more fundamental nature on this problem is therefore envisaged. Investigation of the wear of contacts in relation to arc current and duration has been extended to a.c. circuits and it seems from this work that it should be possible to predict contact life from the results of a few simple measurements.

The experimental overhead lines and associated measuring equipment at Pevensey, where research is in hand on conductor vibration, have been brought into operation and the desired information is beginning to accumulate. The E.R.A. surge filter, which was never called upon to operate in eight years at Weston-super-Mare, has functioned successfully seven times in the first year at its new site in the East Midlands Area.

E.R.A. research over the last ten years on wind power has made possible the design and construction of a 100 kW generator at a competitive price. This machine has been purchased and erected by the Isle of Man Electricity Board and is undergoing tests in which E.R.A. staff are assisting. The Isle of Man generator works in parallel with the supply network, but a small generator erected at a Nature Conservancy warden's house in Scotland is the sole source of electric power.

Research has established quantitatively the importance of the proper use of thermal insulation in the floors of multi-storey buildings heated intermittently by electricity and has shown that certain grades of bituminous floor surface materials are suitable for use with electric off-peak floor warming.

Laboratories

Good progress is being made with the construction of the new creep laboratory and office block at Cleve Road. The former should be ready for occupation by mid-1960 and the latter six months later. In the case of the creep laboratory, the Association was successful in its application to the D.S.I.R. for a capital grant.

The Association has gained 32 new members during the year but, unfortunately, owing to losses arising from the new membership terms and to amalgamations of companies, the net result is 20 fewer than in 1958. The position at present is that there are 224 ordinary members (206 manufacturers and 18 supply authorities), 74 associate members, 36 overseas members and 24 associates.

A.C. ELECTRIC LOCOMOTIVE

First G.E.C. 25 kV Unit in Service

THE first of ten 25 kV electric locomotives for passenger and goods train duties, including 100 m.p.h. expresses, ordered from the General Electric Co., Ltd., is now in service on driver training on the London Midland Region of British Railways. The locomotives have been designed to the requirements of the British Transport Commission and the mechanical parts have been supplied by the North British Locomotive Co., Ltd. Provision has been made for operation on both 25 and 6.25 kV, 50 c/s supplies. With the exception of the main transformer and its associated equipment, the unit can be divided into two virtually identical halves. In an emergency single traction motors can be isolated, and a complete bogie, with its auxiliary equipment, rectifiers, etc., can be cut out.

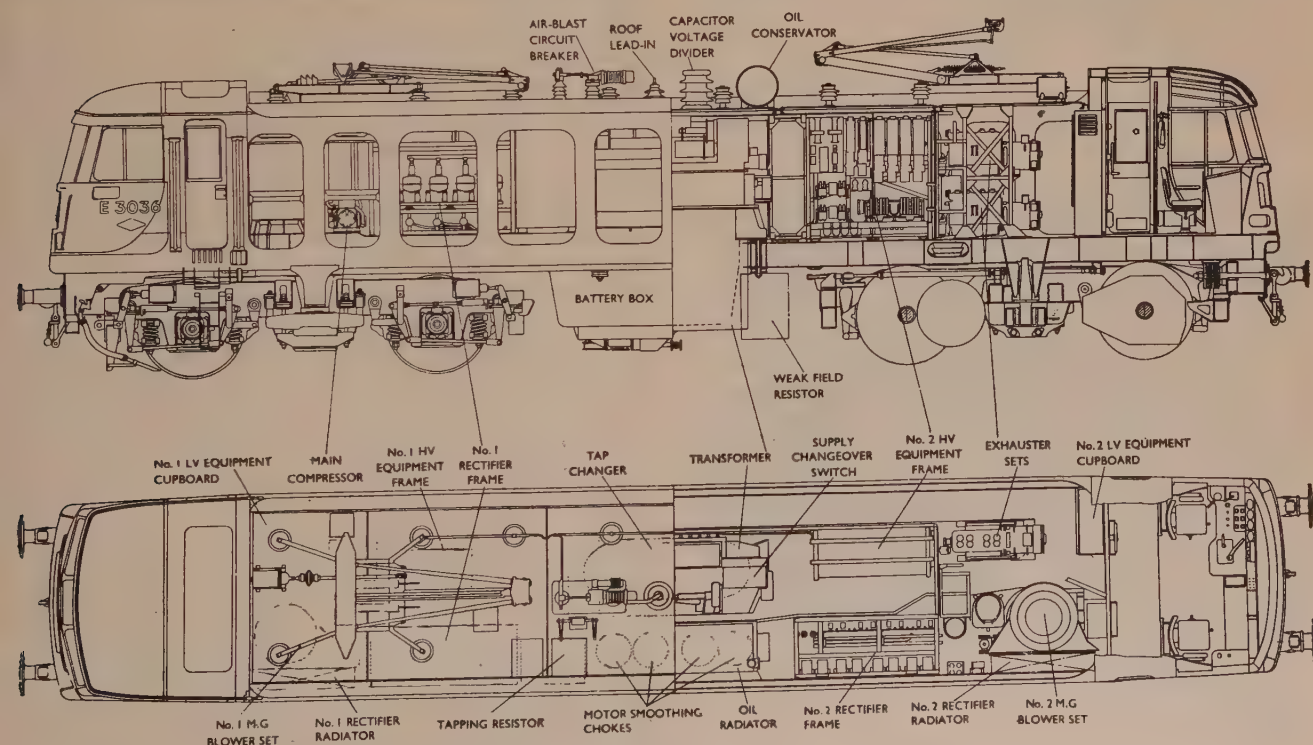
PRINCIPAL DATA

Wheel arrangement	Bo-Bo
Maximum speed	100 m.p.h.
Continuous h.p. rating	3,300
Maximum tractive effort	50,000 lb
Tractive effort at continuous rating	21,000 lb at 54 m.p.h.
Weight in working order	76.5 tons
Length over buffers	53ft 6½in
Height over cab	12ft 4 7/16 in
Maximum width	8ft 8½in
Wheel diameter	4ft 0in

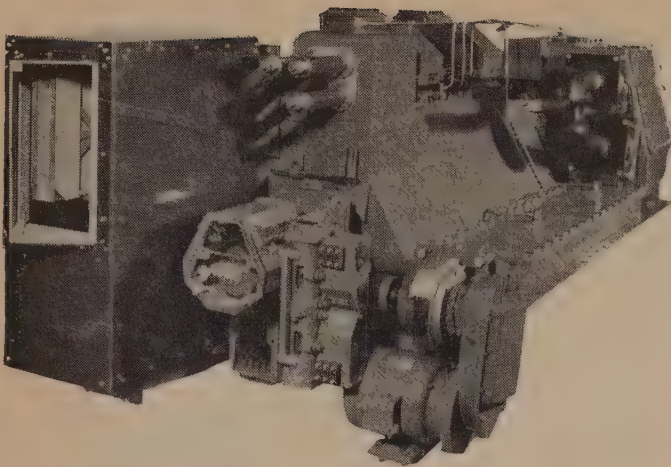
The high-voltage equipment is contained in a steel enclosure, one side of which forms the inner wall of the corridor connection between the two cabs. The supply



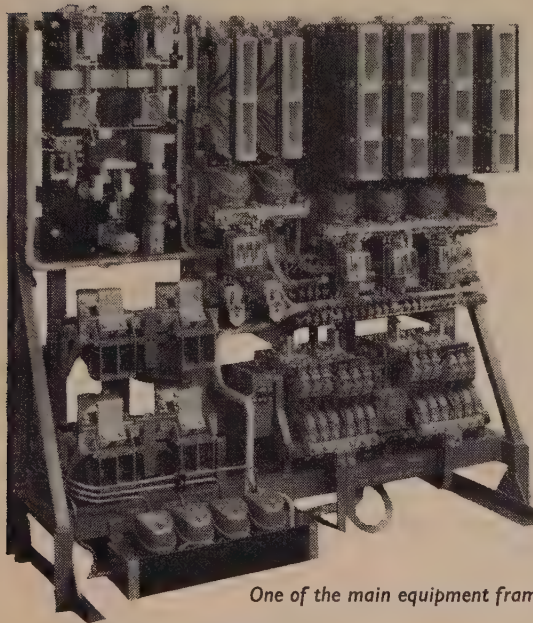
change-over switch and the motor-driven tap-changer are mounted on top of the main transformer, which is centrally located and divides the h.v. compartment into two sections. Each of these sections contains a h.v. apparatus frame and one bank of rectifiers with secondary h.v. gear. Machinery compartments housing the m.g. blower sets and other auxiliary equipment are located at each end of the locomotive. At one end are mounted two exhaustor sets, a rack for the brake equipment control



General layout of locomotive showing the principal items of equipment

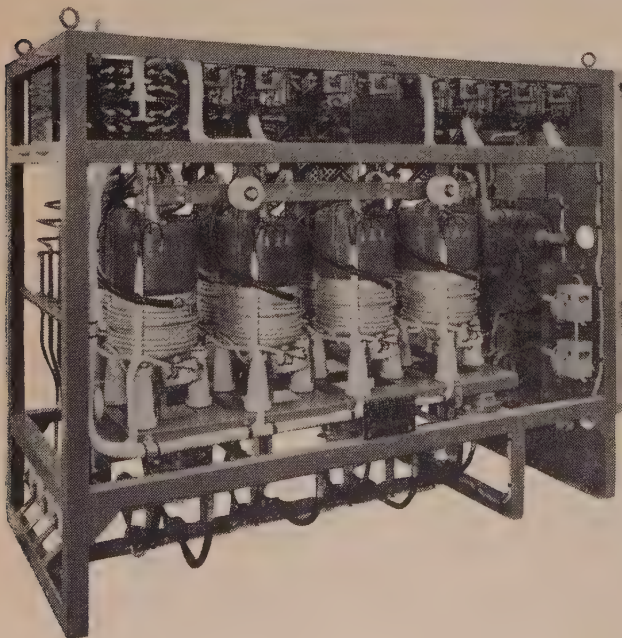


The h.v. tap-changer unit



One of the main equipment frames

A rectifier frame showing the liquid cooled "Com-Pak" rectifier units



valves and a toilet. The main air compressor is mounted at the other end, with an auxiliary compressor which is normally used when preparing a locomotive for service, and which runs off the battery to provide sufficient air pressure to raise the pantograph and close the air-blast circuit-breaker.

The access doors to the h.v. compartment are interlocked with the pantograph-raising and roof-earthing gear so that they cannot be opened without first dropping the pantograph and earthing the circuit-breaker. The pantograph cannot be raised until the doors are closed and locked. Batteries, weak-field resistors and air reservoirs are carried under the main frame between the bogies. The principal cable runs are carried in a duct below the corridor floor.

Current Collection and Conversion

Current is collected from the overhead line by one of two Stone-Faiveley pantographs, feeding through a Brown-Boveri air-blast circuit-breaker to the supply change-over switch. This is an off-load switch operating under the control of automatic voltage detection and selection equipment to give the correct transformer tapping for running on a line voltage of 25 or 6.25 kV. The output from the transformer, which is cooled by forced oil circulation, is taken from two secondary windings, each of which supplies eight "Com-Pak" mercury-arc excitron rectifiers. These are arranged so that each pair of traction motors is fed in bridge by four rectifiers from each secondary. The connections are such that the motors operate in series pairs under normal conditions. Return current to the track is taken through earth brushes running on the outer ends of the road wheel axles. Liquid cooling is used for the excitron type rectifiers, with separate cooling circuits under thermostatic control for the anodes and cathodes.

Control Scheme

The transformer is provided with a separate tapped regulating winding under the control of the h.v. tap-changer, giving a total of 38 steps. The master controller gives either individual notch control or automatic run-up or run-down. A total of 40 notches is provided, comprising 38 voltage steps, followed by two steps of motor field weakening on full voltage. An over-current relay is arranged to lift at a predetermined current to arrest further notching, to reduce the likelihood of tripping the overloads under run-up conditions. Each traction motor is fed through an overload-controlled electro-pneumatic contactor and a second contactor which are used together for motor isolation. The two steps of field weakening are provided by divert resistors and a permanent smoothing divert resistor is connected across each field. Reversal is effected by two electro-pneumatically-operated two-motor reversers.

Traction Motors and Drives

The four traction motors are six-pole series-wound force-ventilated machines provided with compensating windings. Class "H" insulation is used throughout and the motors have a continuous rating of 750 h.p. (725 A, 850 V) at 1,165 r.p.m. and a one-hour rating of 890 h.p. (875 A, 850 V) at 1,100 r.p.m. The motors are supported in the bogie frame by two brackets on the motor and

an arm extending from the hub of the Brown-Boveri spring drive, which accommodates the relative movement between motor and axle, forming a three-point mounting.

Each motor-generator blower set supplies air for two traction motors and one half of the electrical equipment. The axial type blower draws air through the rectifier radiator mounted behind louvres in the body side. From the blower the air is passed downward into a duct, from which feeds are taken to the traction motors and to the air-cooled main motor chokes and the transformer oil radiator. Pumps for the rectifier coolant and transformer oil circulation are driven by small induction motors supplied from an auxiliary winding on the main transformer.

Each of the two vertically mounted blower sets incorporates a single-phase a.c. motor, a d.c. generator and an axial flow blower. Power for the driving motors is taken from the main transformer auxiliary winding, and for starting the sets are run up to speed by motoring the generator from the battery, automatic change-over to the a.c. supply being provided. The output voltage of one set is regulated and is used to charge the battery, and also to operate one exhaustor set and the auxiliary compressor. The other set, which is not voltage regulated, operates the main compressor and the second exhaustor set. In emergency either set can be isolated, all essential duties being taken over by the other.

LETTERS TO THE EDITOR

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Floor Heating and Radiator Systems

I HAVE read with interest and amusement many of the letters which Mr. Hazel has had published in your columns on the subject of electric space heating. The conclusion I have reached is that, far from acting in the public interest, he is more concerned that the growth of electric floor heating will adversely affect his own business interests. What has his real contribution been? Should there be room for all, including electric floor heating for which he says there is a place even if, as he also says, it has been unsuccessful in every country in which it has been tried? What nonsense!

I work in an office with an electrically heated floor and the comfort conditions are equal to any. Our seasonal consumption is around 1,150 kWh/kW installed, at $\frac{3}{4}$ d per kWh "off peak" and the air temperature has been held within 3-4° throughout the winter, despite a large expanse of glass with a southerly aspect. There are no oil-filled radiators under the windows, nor do we need them.

Attention has been drawn to unsatisfactory installations in other countries with much colder climates than ours but even if true, would it be just to condemn electric floor heating on this score? The requirements in these countries is for a temperature rise of 40-45° and even 50° in some places against 35° rise which is normal here.

Most of the suppliers of electric floor heating equipment limit their loadings to about 15-16 W/sq ft with floor surface temperatures around 75°F. This will provide comfort conditions of about 65°F or slightly higher in buildings of normal construction and insulation. Most manufacturers are agreed that higher floor temperatures are undesirable and would not offer their equipment for these conditions. Is it possible that some of the failures Mr. Hazel says there have been are attributable to this cause?

As for the need to put heaters under windows to combat down draught, this situation is often aggravated by units of too high loading and with a high rate of convection. This problem can be dealt with by floor heating as it is possible with some systems to so grade the cables that

the loading is higher near outside walls and windows and lower near internal walls, although this appears to be done only in exceptional circumstances. Surely this is because it is not normally necessary.

Mr. Hazel did make one useful suggestion and that is that tests should be made by an independent body and data published. Until this happens may I respectfully suggest that Mr. Hazel restrains his dislikes and personal interests and produces some hard facts, fully substantiated, which will be of interest to us all.

Solihull, Warwicks.

C. JENKINS, A.M.I.E.E.

CHANGING TO THE METRIC SYSTEM

ACCORDING to a report "Decimal Coinage and the Metric System—Should Britain Change?" (Butterworths Scientific Publications, price 7s 6d) published this week, three-quarters of the firms in the electrical engineering industry would approve a change to the metric system of weights and measures. However, some 30 per cent of electrical firms make no use of the system. About a third felt that retention of the Imperial system was affecting trade and 50 per cent felt that a change to the metric system should be made without waiting for the United States and Commonwealth. It was generally considered that two to three years would be required to make preparations and ten to fifteen to complete the change.

Nevertheless, the report is unable to recommend a compulsory change-over to the metric system in the immediate future because the "benefits appear to be small and outweighed by the extremely high transitional costs, particularly in engineering." However, they consider that practice in the use of the metric system and decimal thinking should be encouraged to enable the U.K. to keep abreast of the world trend, and they recommend that the Government should institute two yearly reviews of the situation. There is felt to be a strong case for adopting a decimal coinage.

The report is the joint work of committees appointed by the British Association for the Advancement of Science and the Associations of British Chambers of Commerce and is based on some 1,000 replies to questionnaires. The report includes suggestions for improving the Imperial system.

INDUSTRIAL NEWS

Court Order on E.L.F.A. Agreement

We reported in our issue of 25th March (p. 587) that the Electric Light Fittings Association had decided not to continue its case before the Restrictive Practices Court and had terminated its trading codes. On 26th April the Court made an agreed order that the agreement was contrary to the public interest. As the agreement had been terminated the Registrar did not proceed with his application for an injunction.

Radio Equipment Industry in 1959

The turnover of the radio equipment industry in 1959 reached a record level of £115.5 million, stated Mr. F. W. Perks, chairman of the British Radio Equipment Manufacturers' Association, at the annual luncheon of the Association held in London on Friday last week. Of the total, television accounted for more than £94 million. Sales of radio receivers also reached an all-time record and were expected to increase further during 1960. The public spent nearly £217 million on radio and television receivers and radiograms during 1959.

Mr. Perks said that their exports to Europe had already begun to be adversely affected by the establishment of the Common Market, but they hoped to benefit from the European Free Trade Association (the "Outer Seven") which would come into effect on 1st July next. The importance of the American market was recognised by B.R.E.M.A. which, in addition to sponsoring, had carried out the organisation and provided administrative staff for a composite exhibit at the forthcoming British Trade Fair in New York.

Touring Exhibition

A touring exhibition of industrial equipment, opened by the Mayor of Croydon on 26th April, has been organised by Mr. W. G. Appleyard, of Birmingham. It will be on tour for 13 weeks and after leaving London will visit the principal industrial centres in the provinces and in Scotland. It is intended to provide prospective customers with the opportunity of inspecting products without having to travel to one of the national exhibition centres. Among the exhibitors taking part are Hughes-Johnson Stampings, Ltd., Light-Metal Forgings,

Ltd., the Industrial Fan & Heater Co., Ltd., West Instrument, Ltd., and Firth Cleveland Tools, Ltd.

New A.E.U. Wage Claim

At its meeting at Blackpool last week the National Committee of the Amalgamated Engineering Union unanimously approved a resolution in favour of a new claim for a wage increase of at least £1 a week. The leaders of the Union were criticised for not pressing for a wage increase as well as a reduction in hours in the recent negotiations. On the shorter hours, Mrs. Money (Motherwell) said many women felt that it was rather a nuisance to have their men "under their feet" for two hours more a week, and with two hours more to spend the money they earned.

Industrial Art Bursaries Competition

An exhibition of the winning and commended designs submitted in the Industrial Art Bursaries Competition organised by the Royal Society of Arts in 1959 will be held at the Society's House from 18th May to 3rd June. It will be opened by Mr. Whitney Straight, C.B.E., M.C., D.F.C., on 17th May.

Reactor Graphite Temperature Recording

Following the Wigner release accident at Windscale, a new instrumentation panel containing seven strip chart recorders has been installed on the BEPO research reactor at A.E.R.E., Harwell. These multiple pen instruments give a permanent record of

graphite temperatures and were supplied by Honeywell Controls, Ltd. Also fitted to the panel are 12 Bailey trip amplifiers. A previous instrumentation panel for organic loop testing, which includes Honeywell chart recorders, is to the left of the illustration.

Lamp Price Reductions

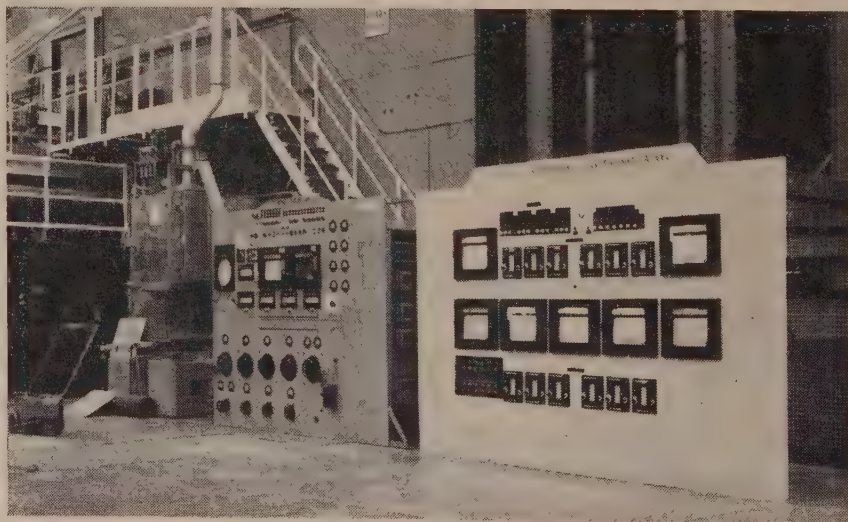
A reduction of 1d in the price of coiled-coil lamps, bringing them to the same level as single-coil lamps, has been announced by the following companies:—A.E.I., Atlas Lighting, Ekco Ensign, the G.E.C., Philips Electrical and the Stella Lamp Co.

Lighting Fittings

The A.E.I. Lamp & Lighting Co., Ltd., has reduced the prices of its fluorescent commercial diffuser lighting fittings. The reductions vary from 7 per cent to 10 per cent. It has also further reduced the price of one of its commercial diffuser fittings (type F 2232). The 5ft single lamp version is now priced at £13 11s 9d (including p.t.), a reduction of 17 per cent.

"Outer Seven" Tariff Provisions

On 1st July next the tariff provisions of the Convention establishing the European Free Trade Association (E.F.T.A.) will begin to take effect. The *Board of Trade Journal* for 29th April contains a 12-page supplement of "Notes for the Guidance of Exporters." Copies of the various forms to be used are included. A brochure, "European Free Trade Association—Compendium for the Use of Exporters," will be published shortly



The additional instrumentation panel for the BEPO reactor

by the Stationery Office. The information given in the blue-covered supplement (Cmnd. 906-1) to the White Paper text of the body of the Convention (Cmnd. 906) is no longer up-to-date.

Perkins' American Company

A new American company, the Perkins Engine Co., Inc., has been formed with headquarters in Detroit. It will market the products of F. Perkins, Ltd., Peterborough. In charge of the new company will be Mr. J. P. Allan (executive vice-president), who will be resident in Detroit. Other directors are Mr. M. I. Prichard (president), Mr. T. H. R. Perkins and Mr. M. S. Harlan.

Lec Refrigeration Aircraft

A new aircraft, a Piper "Comanche," has been delivered to Lec Refrigeration, Ltd., and will be used by the company principally to foster its export business. The aircraft has a cruising speed of nearly 200 m.p.h. and a range of over 1,000 miles. It is fitted with radio communication and navigational equipment, and an automatic pilot.

Sale-or-Return Arrangements

The Commissioners of Customs and Excise have recently been reviewing the results of investigations into transactions at or about the time of the 1959 Budget, in taxable goods which had been supplied to retailers by registered manufacturers and wholesalers on sale-or-return or similar terms. Considerable inaccuracies have been found in the notifications of dates of sale or appropriation in the periodical returns submitted by dealers to their suppliers; these have resulted in the goods concerned being improperly returned as liable to the post-Budget rates of tax instead of at the higher pre-Budget rates. The registered suppliers are being required to make good this tax loss.

The Commissioners draw attention to the fact that returns required under sale-or-return or similar arrangements should be furnished to the registered suppliers promptly and accurately, and that continued laxity in this matter might cause fresh consideration to be given to the reactions of this system of trading on the purchase tax.

Transport Exhibition

One of the ten 25 kV a.c. electric locomotives being supplied by the General Electric Co., Ltd., to British Railways for passenger and goods train duties in the London Midland Region was shown last week at the Marylebone exhibition of the Institute of Transport Congress. One of the

Sir Leslie Gamage at the controls of the new 25 kV a.c. electric locomotive at the Marylebone exhibition of the Institute of Transport Congress



visitors to the exhibition was Sir Leslie Gamage, chairman and managing director of the G.E.C., who is shown in a cab of the new locomotive. These units are described on page 867.

New Computer Centre

The simultaneous opening of International Computers & Tabulators, Ltd., new demonstration centre at Hamilton House, 138, Piccadilly, London, W.1, and their computer centre at Putney Bridge House, London, S.W.6, was carried out on 28th April by the Paymaster General, Lord Mills, using a closed-circuit television link. He was assisted at Putney Bridge House by the Mayor of Fulham, Councillor W. J. Bolton, J.P., who started one of the installed computers. This six-storey building contains 34,000 sq ft of office space and includes "machine-rooms" for three or more computers, three conference rooms with facilities for showing films and other visual aids and "visitors' rooms" for informal discussions. The Centre also houses the Computer Group, comprising over 200 specialists and supporting staff, the two main sections of which are the Applications Department and the Central Programming Service.

Transmission Line Accessories

For more than a year now Preformed Line Products (Great Britain), Ltd., have been manufacturing a wide range of overhead electrical transmission line accessories under licence from the Preformed Line Products Company of Cleveland, Ohio, at its factory at Andover, Hants. Now that the company has become firmly established and business is flourishing, particularly in the export field, it has entered into a partnership with the American company. Last week a meeting was held at the Andover works under the chairmanship of Mr. Eric Neate,

managing director, Preformed Line Products (Great Britain), Ltd. Also present were Mr. T. F. Peterson, the inventor of the range of Preformed devices and president of the American company, Mr. J. R. Ruhlman, vice-president for research and engineering, and Mr. R. F. Hollitz, vice-president for foreign operations, all three of whom have just joined the board of the British company. This meeting was held primarily for the benefit of potential customers from the Central Electricity Generating Board and the Area Boards. Mr. Ruhlman gave an interesting account of the development of the company and the range of devices which it manufactures and also showed a film dealing with overhead transmission line research in the United States.

International Sales Conference

A four-day international sales conference was held in London last week by Dewrance & Co., Ltd., manufacturers of boiler mountings and pipe line valves. Executives from their agencies in Australia, Belgium, Canada, Denmark, Eire, Finland, France, Holland, Italy, Malaya, Norway, South Africa and Sweden attended the conference, in which branch office managers and home sales staff also participated. Mr. J. M. Storey, managing director, and Mr. B. S. Bass, sales director and chairman of the conference, gave information on the company's future trading policy, overseas expansion and the introduction of the "Microsen" process control system. Mr. J. H. Gibson, director and chief engineer, and his staff gave a series of talks on recently introduced equipment and experts from the company's American associates, the Automatic Switch Company, introduced the "Asco" solenoid valves which the company is now producing and marketing under licence. During the

conference details were also given of the development of automatic sequence control systems and specialised systems for the automatic control of oil burners as applied to large pulverised fuel fired boilers.

In support of the conference the company also arranged an exhibition at its Great Dover Street works. Much of the equipment on view will also be displayed at the forthcoming Instruments, Electronics and Automation Exhibition.

Gas Engineer's View of Electricity

In his address to the Manchester and District section of the Institution of Gas Engineers, on 29th April, Mr. W. Hodgkinson, the chairman, dealt with the prospects of gas and electricity. After quoting figures of the increase in electricity consumption, he said it seemed reasonable to adopt a figure of 7 per cent as the probable rate of increase in the period up to 1965. At this rate, electricity would rise to about 150,000 million kWh in that year.

Between 1950 and 1958 the average realised price of gas increased by 62 per cent, while the average price of electricity increased by only 32 per cent in the same period. This adverse trend of relative prices had reflected the relatively greater rise of coal costs to the gas industry, as against coal costs in electricity supply. The average cost of coal for electricity supply was four times higher in 1958-59 than in 1939, but the cost of coal for gas making (North-West Area) was five times higher.

Mobile Exhibition

To enable designers and engineers to see its components and to discuss their characteristics and applications, a new mobile exhibition unit has been introduced by Standard Telephones &

Cables, Ltd., which is visiting users and prospective users on their own "home ground." Being limited in size, the exhibition includes only a small cross-section of the wide range of components made and marketed by S.T.C., including valves, transistors, thermistors, rectifiers, quartz crystals, wave filters, capacitors, resistors, transformers and magnetic materials.

Electricity in Gardening

An exhibition, "Gardening with Electricity," was opened on Tuesday by Mr. Gerald Nabarro, M.P., at Fisons' London Garden Centre, Wigmore Street, W.1. The exhibition, which has been organised by the London Electricity Board, will remain open for a fortnight.

Industrial Safety Conference

One of the speakers at this year's National Industrial Safety Conference, organised by the Royal Society for the Prevention of Accidents, at Scarborough (27th-29th May) will be Mr. R. H. Coates, controller of the Southern Division of the Central Electricity Generating Board, who will present a paper entitled "The Specialist as Part of the Team."

Batti-Wallahs' Society

The political and economic problems of the Middle East were discussed by Lt.-General Sir John Glubb ("Glubb Pasha") at last week's luncheon of the Batti-Wallahs' Society. He spoke of the Arab desire to be independent of both Eastern and Western influence, but pointed out the danger of the infiltration of Communist ideas. The countries of the Middle East had become largely literate, but otherwise education was below the standards of Western Europe. This made the people very receptive to new ideas. Communist countries were alive to this

fact and were endeavouring to instil the Communist doctrine in the younger generation. The Western countries would do well to concentrate less on

the present régimes in the Middle East and more upon the future.

Mr. H. E. Fleetham (the "Mate") announced that the next luncheon would be held on Thursday, 26th May.

Offer of "Electrical Review" Volumes

Nalder Bros. & Thompson, Ltd., 97, Dalston Lane, London, E.8 (Clissold 2365), tell us that they have a set of volumes of the *Electrical Review* running from January-June, 1914, to July-December, 1931, which they are willing to present to any organisation, or individual, who would like to have them.

S. Smith & Sons (England) Brochure

A well-produced brochure with numerous illustrations (many in colour) has been issued by S. Smith & Sons (England), Ltd., with the title "World of Meaning . . .", in which the varied activities of the group of companies in the fields of aeronautics, shipping, industry, railways and in the home are described.

Trade Announcements

The **Transitron Electronic Corporation**, of Wakefield, Mass., U.S.A., announces the formation of a European sales subsidiary, **Transitron Electronic S.A.**, with headquarters in Zug, Switzerland, and sales subsidiary offices in London, Paris and Munich. Further sales offices are shortly to be opened in Dusseldorf and Milan. The London office, **Transitron Electronic, Ltd.**, will be at Bilton House, Ealing, London, W.5, and this company will be responsible for marketing the parent company's semiconductor and other products in the United Kingdom. The office will be managed by Mr. D. P. O'Connell, formerly with the **British Electric Resistance Co., Ltd.**

Mr. G. Hanson, until recently manager of the Glasgow East district of **Hoover, Ltd.**, has retired after thirty years' service, and the following appointments are announced:—Mr. J. Anderson succeeds Mr. Hanson as district manager of Glasgow East; Mr. F. Donnelly has been appointed district manager of Glasgow West; and Mr. R. B. Carpenter has been appointed district manager of Bolton.

Mr. J. H. Bray, who has been responsible for all London postal districts of **Geo. Bray & Co., Ltd.**, has left the field sales force (home) to join the overseas sales force. His territory has been taken over by Mr. J. H. Rawcliffe who leaves the eastern territory, now taken over by Mr. G. A. Atkinson.



Interior of the Standard Telephones & Cables mobile exhibition

PERSONAL AND SOCIAL

News of Men and Women of the Industry

Mr. C. W. Oatley, O.B.E., M.A., M.Sc., M.I.E.E., of Trinity College, Cambridge, University lecturer in mechanical sciences, has been elected

Professor of Electrical Engineering in succession to **Professor E. B. Moullin**, M.A., Sc.D., M.I.E.E., who, as we have already reported, is retiring from the Chair of Electrical Engineering at Cambridge University on 1st October.



Mr. C. W. Oatley

Mr. Oatley was educated at Bedford Modern School and St. John's College, Cambridge. After two years in industry he was appointed to the staff of the Physics Department, King's College, University of London, where he remained until 1939. During the last war he was at the Radar Research and Development Establishment of the Ministry of Supply and in 1944-45 was in charge of the scientific work of this establishment. In 1945 he was appointed to the staff of the Engineering Department of Cambridge University and was elected to a Fellowship of Trinity College. Mr. Oatley was chairman of the Radio Section of the Institution of Electrical Engineers for 1954-55.

Sir Ronald German, C.M.G., has been appointed to succeed **Sir Gordon Radley**, K.C.B., C.B.E., who is retiring, as director general of the Post Office. Sir Ronald takes up his new appointment on 1st June. He first joined the Post Office in 1925 and later for a time served in the Treasury. From 1942 to 1945 he was assistant director of the Sudan Posts and Telegraphs Department, and from 1950 until his appointment as deputy director general of the Post Office he was Postmaster General of East Africa.

Mr. W. A. Wolverson has been appointed a deputy director general of the Post Office in succession to Sir Ronald.

Lord Nelson of Stafford, chairman of the English Electric Co., Ltd., presented the awards at the **Vickers-Armstrongs (Aircraft) Co.'s** annual apprentice prizegiving on 25th April. With him on the platform were the chairmen of the other parent com-

panies, Lord Knollys (Vickers, Ltd.) and Sir Reginald Verdon Smith (Bristol Aeroplane Co., Ltd.), and other directors of the parent or constituent companies.

Mr. E. A. Ward, A.C.W.A., has been appointed company secretary of Lancashire Dynamo Electronic Products, Rugeley (a Metal Industries Group company). Apart from war service with the Commandos and the Intelligence Corps, Mr. Ward has been engaged in the engineering industry since 1943. He joined Lancashire Dynamo Electronic Products in 1957 as chief accountant and will continue to hold this position in addition to his new appointment.

Mr. R. Cloke, A.M.I.E.E., has been appointed a senior assistant engineer at the Wherstead headquarters of the Eastern Electricity Board, in succession to **Mr. H. T. Ransley**, who was recently appointed engineer, Fens Sub-Area. Mr. Cloke joined the Board in 1948 as an assistant engineer in the development section at headquarters.

Mr. J. B. Woodeson, O.B.E., chairman of Clarke, Chapman & Co., Ltd., has been elected president of the North East Coast Institution of Engineers and Shipbuilders for 1960-61. Among the new members of the Council is **Mr. A. T. Bowden**, B.Sc., Ph.D., director and chief research engineer, C. A. Parsons & Co., Ltd.

Dr. P. Axon, O.B.E., managing director of Ampex Electronics, Ltd., has been further appointed as managing director of Redwood City Engineering, Ltd., the United Kingdom marketing subsidiary of Ampex International S.A. (Fribourg, Switzerland).

Two employees of the Central Electricity Generating Board have been awarded City and Guilds of London Institute bronze medals as the best candidates in the examinations for the boiler operator's certificate and steam plant operator's certificate. They are **Mr. F. G. Harvey**, of Rogerstone power station, Newport, Mon. (boiler operator's certificate), and **Mr. G. Craddock**, of Castle Donington power station, Nottinghamshire (steam plant operator's certificate).

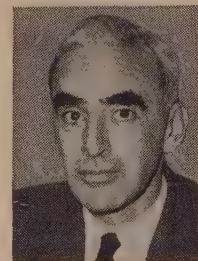
In addition to the City and Guilds award, the National Industrial Fuel Efficiency Service gives awards to the most successful candidates in the

boiler operator's certificate examination. Three Generating Board employees have won awards under this scheme: **Mr. Harvey**, **Mr. A. C. Page**, of Littlebrook power station, Kent, and **Mr. J. R. Stringer**, of Marchwood power station, Hampshire.

Mr. D. A. Akins, managing director of Boving & Co., Ltd., accompanied by Mrs. Akins, will be visiting Rhodesia to attend the official opening ceremony of the Kariba Dam by H.M. Queen Elizabeth the Queen Mother, on 17th May. By that date, two Boving turbines, each of 140,000 h.p. capacity, will be delivering power to the Copperbelt in Northern Rhodesia. The remaining four units are in course of erection and are progressing to schedule. Mr. Akins will leave England on 7th May and will be visiting the representatives of Boving & Co. in Nairobi and Salisbury.

Mr. M. L. Jofeh, O.B.E., A.M.I.E.E., manager of the Industrial Division of

the Sperry Gyroscope Co., Ltd., has been appointed an additional director. He joined the company in 1947 as an equipment engineer, and later headed the engineering unit at the company's Stonehouse (Glos.)



Mr. M. L. Jofeh

factory for a number of years. In 1954 he returned to Brentford to take up the position of deputy chief engineer and later chief engineer of the company with responsibility for the design of all new equipment. He became manager of the Industrial Division in January last year.

Mr. H. M. Longridge, chairman since 1936 of the British Engine, Boiler & Electrical Insurance Co., Ltd., has intimated his desire to relinquish that office but will continue as a director. **Mr. R. R. Mason** has been elected to succeed him as chairman.

At the annual general meeting of the **Aluminium Development Association** on 29th April the retiring president, Mr. R. Hahn, presented the annual report. Mr. W. Brining, F.C.A., was elected president of the Association

for 1960-61. He represents the Almin group of companies on the A.D.A. Council. Mr. Hahn, who represents the Association of Light Alloy Refiners and Smelters, Ltd., on the Council, was elected vice-president.

Mr. George A. Thompson, M.B.E., editor of the Electrical Development Association journal *Electrical House-keeping* since 1949, has resigned from that post to concentrate on other projects.

Mr. J. A. Jackson, works director of Wolf Electric Tools, Ltd., left for Canada by air on 1st May on a business visit to the company's branch at Toronto.

Wolf Electric Tools, Ltd., has appointed **Mr. Klaas van Walraven** as sales supervisor for Holland.

Mr. P. A. Charman has been appointed sales development manager of Semiconductors, Ltd. He will be responsible principally for dealing with technical aspects of customers' needs, especially in their long-range planning.

Mr. C. Reid, D.S.O., chairman of the Electric Construction Co., Ltd., recently presented long-service presentations to Mrs. Edith Robinson, Switchgear Test, who has completed forty-five years' service, and to Mr. T. Bench, works office, with fifty years' service.

Mr. R. Thompson, managing director of Leo Computers, Ltd., left London for Johannesburg by B.O.A.C. on 1st May on a ten-week visit to South Africa, Australia and Ceylon. He is due back in this country on 11th July.

At the annual general meeting of the Association of British Ebonite Manufacturers, held on 28th April, **Mr. A. W. Hopkins** (General Electric Co., Ltd.) was re-elected chairman for 1960-61.

Mr. T. Murray, deputy chairman of the Electricity Supply Board, Dublin, has been appointed chairman in succession to **Mr. R. F. Browne**, who retired on 30th April.

Mr. F. D. Parker has been appointed managing director and **Mr. D. H. Carter** director and general manager of McKee Head Wrightson, Ltd. Mr. Parker was formerly vice-president of the American company, Arthur G. McKee, and Mr. Carter was director and general manager of Head Wrightson Processes, Ltd.

Mr. J. H. Strathie has been appointed deputy chairman of United Fireclay Products, Ltd., in place of **Mr. W. G. Logan**, who has relinquished the deputy chairmanship owing to illness. **Mr. M. Richards** has resigned from

the board and **Mr. J. H. Johnston** has been appointed a director.

Mr. W. I. Nielson has been appointed secretary of Lumenated Ceilings, Ltd., a member of the Hall-Thermotank group of companies, in succession to **Mr. H. R. Heaven**. Mr. Nielson has been chief accountant to Lumenated Ceilings, Ltd., since 1955.

Mr. C. B. Mullins, who has been secretary of the South Wales Electricity Consultative Council in a part-time capacity since 1957, has relinquished that appointment. At a recent meeting the Council paid tribute to the excellent service which Mr. Mullins had given it. **Mr. C. T. Martin**, A.C.I.S., has been appointed full-time secretary.

Mr. A. L. Sutherland, a director of Philips Electrical, Ltd., has been elected chairman of the British Radio Equipment Manufacturers' Association in succession to **Mr. F. W. Perks** (British Radio Corporation, Ltd.). **Mr. W. M. York**, commercial director of E. K. Cole, Ltd., has been elected vice-chairman.

OBITUARY

Mr. L. E. Wood, A.M.I.E.E., chairman of the Airedale Electrical & Mfg. Co., Ltd., died on 27th April at the age of eighty. Mr. Wood commenced his career at H.M. Dockyards, Chatham and Sheerness, and subsequently was with the Frontino & Bolivia Gold Mining Co., Colombia, the Taquah Mining & Exploration Co., Gold Coast, and Montreal Cottons, Ltd., Quebec (1912-19). He was a founder member of the Airedale Electrical & Mfg. Co., Ltd.

Mr. Arthur Stafford Kettle, M.I.E.E., who was manager of the Construction Department of the British Thomson-Houston Co. (now A.E.I. (Rugby), Ltd.) until 1956, and then continued until his retirement in September, 1957, as consultant to the Construction Department and Service Engineer's Department, died on 26th April at the age of sixty-nine. Mr. Kettle served a three-year



The late
Mr. A. S. Kettle

apprenticeship with the Bournemouth & Poole Electricity Supply Co. and was shift engineer at Christchurch power station before going to Rugby in 1911 to join the B.T.H. Testing Department. In 1915 he was appointed chief-of-test, a position he held until

1928 when he became service engineer. During the last war he was seconded for duty as manager of the Brimsdown Works of the A.E.I. Group engaged on the production of electronic components for the Services. He returned to Rugby in 1946 and, two years later, became manager of the Construction Department. Mr. Kettle was president of the Rugby Engineering Society for 1939-40.

Mr. W. J. Belsey, who, until his retirement, was for 42 years with the British Thomson-Houston Co., died on 23rd April at the age of eighty-six. He retired from the managership of the Marine Department in 1944 but remained with the company for a time in a consultative capacity. Mr. Belsey played a prominent part in the application



The late
Mr. W. J. Belsey

of electric drive to ships and one of the earliest of his ventures was the propulsion equipment for the United Fruit Co.'s ship *San Benito*, built in 1921. Mr. Belsey joined the B.T.H. Co. in 1902 and was subsequently manager at Belfast and Glasgow. When the B.T.H. Marine Department was formed at Rugby in 1919 Mr. Belsey was appointed manager.

Mr. P. C. Jones.—The death occurred on 28th April, at the age of seventy-five, of Mr. Percy Cleasby Jones, M.I.E.E., sales director of Allen West & Co., Ltd., until he retired in 1957. After early training with the former British Westinghouse Co., Mr. Jones joined Allen West & Co. in 1911. He opened the company's Manchester office, and was manager there for seventeen years before going to Brighton as sales director in 1928.

Mr. R. F. Winder, manager of the Chilterns Sub-Area of the Eastern Electricity Board, died on 22nd April at the age of sixty-one. Mr. Winder was appointed to the Chilterns Sub-Area in succession to Mr. S. F. C. Whitmore in May last year and had previously been the manager of the Hendon District in the Northmet Sub-Area of the Board. Educated in Croydon and later at King's School, Canterbury, he served in the 1914-18 war, first in the Royal Flying Corps and later in the Royal Air Force, and gained his wings as a pilot. On his release from the Service he received his technical training at Faraday House and from 1923 to 1924 was employed

by W. T. Henley's Telegraph Works Co., Ltd. He then joined the North Metropolitan Power Co. and in 1938 became district manager at Hertford. In 1952 he was appointed district manager of Hendon.

Mr. A. Blackstock, latterly joint managing director of Langley London, Ltd., died recently. The cremation and funeral service took place at Purley on 14th April.

Mr. John Barker Gatley, managing director of W. H. Gatley & Co., Ltd., electrical engineers and contractors, Todmorden, died on 30th April at the age of forty-five.

Mr. L. J. Cross.—The death has occurred of Mr. Leonard Jack Cross, senior lecturer in electrical engineering at Coventry Technical College. He was fifty-six.

WILLS

Mr. W. S. Dyer, A.M.I.E.E., A.M.I. Mech.E., retired consulting engineer, who died on 9th September last, left £18,003 gross (£17,865 net). Among his bequests were £500 each to the Benevolent Fund of the Institution of Electrical Engineers and the Benevolent Fund of the Institution of Mechanical Engineers.

Mr. E. W. L. Cowan, managing director of Landis & Gyr, Ltd., who died on 31st October last, left £11,269 gross (net value nil).

Mr. C. A. Perry, managing director of Welco Hardware & Lamps, Ltd., who died on 28th January last, left £45,544 gross (£39,008 net).

Major C. E. Prince, O.B.E., M.I.E.E., former director of Radiovisor Parent, Ltd., who died on 25th September, 1957, left £5,875 gross (£932 net).

Mr. H. V. Ellis, director of the City Electrical Co., who died on 21st December last, left £77,114 gross (£75,440 net).

Mr. F. V. N. Marshall, a director of H. J. Baldwin & Co., Ltd., who died on 28th September last, intestate, left £24,242 gross (£22,967 net).

Mr. T. N. Robinson, director of T. N. Robinson, Ltd., wholesale electrical suppliers, left £36,698 gross (£35,714 net).

Prices of Materials

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures given are the selling prices and are those quoted on Tuesday last.

ALUMINIUM ingots	ton	£186	os	od
COPPER, H.C. Electro	ton	£258	os	od
Fire Refined 99.70%	ton	£257	os	od
Fire Refined 99.50%	ton	£256	os	od
COPPER Tubes	lb	2s	6d	
Sheet	ton	£292	15s	od
H.C. wire and strip	ton	£310	15s	od
LEAD, English	ton	£77	5s	od
Foreign	ton	£76	os	od
MERCURY	flask	£70	10s	od
TIN, block (English)	ton	£783	10s	od
ZINC, G.O.B. Foreign	ton	£93	5s	od
BRASS Tubes (solid drawn)	lb	2s	0½d	
Wire	lb	2s	10½d	
PHOSPHORBRONZE	lb	4s	4d	
Wire	oz	£30	5s	od
PLATINUM				
RUBBER, No. 1 R.S.S.	lb	36d—36½d		
spot				

Hire-Purchase and Hiring Restrictions

THE Board of Trade announces that, as indicated in the statement by the Chancellor of the Exchequer in the House of Commons on 29th April, it has made Orders imposing restrictions affecting the initial deposit and the repayment period in certain hire-purchase and credit sale agreements and affecting the initial payment on certain hiring agreements entered into after 28th April, 1960.

The hire-purchase order covers a narrower range of goods than the orders in force during the major part of the last period of restrictions. Capital goods are excluded.

Until the hiring order advance payment of all rentals and charges payable in respect of the first three months is required. The hiring (rebates) order is designed to reinforce the hire-purchase restrictions. It applies to the goods covered by the hire-purchase order and prohibits a certain form of rental agreement which provides for the payment of "rebates."

The orders, which came into force on 29th April, 1960, are: The Hire-Purchase and Credit Sale Agreement (Control) Order, 1960 (S.I. 1960, No. 762) (price 5d). The Control of Hiring Order, 1960 (S.I. 1960, No. 763)

(price 4d). The Control of Hiring (Rebates) Order, 1960 (S.I. 1960, No. 764) (price 3d). Copies may be obtained from H.M. Stationery Office.

Commenting on the hire-purchase changes, the British Electrical and Allied Manufacturers' Association stated that while recognising the importance of preventing the growth of inflationary tendencies they were "glad that at least some of the essential appliances have been picked out for easier treatment in the new hire-purchase terms. The B.E.A.M.A. have pressed the view that these appliances, essential in the modern home, should be made available with the minimum of restriction."

The Association are very concerned, however, about the "tendency to use the easy facility of credit control on domestic electrical appliances as an all too frequent instrument of fiscal policy." They point out that manufacturers of these appliances have made considerable investments in expanding their production, including expansion in the development areas, and it will not be easy for this policy to be continued if it is subject to frequent short-term measures affecting trading conditions.

Electrical Goods Affected

Goods to which the hire-purchase order applies, and for which a minimum deposit of 20 per cent is required, with a maximum of two years for payment of the balance are:

Radio receiving sets and television receiving sets (including portable sets and sets designed for use in road vehicles), whether or not assembled and whether or not complete, and parts thereof; television aerials, cathode-ray tubes, loudspeakers and television conversion units; gramophones, radio-gramophones, record players, tape recorders and parts.

Space heating installations and appliances of a kind designed exclusively or mainly for domestic use, and parts thereof.

Appliances and apparatus, whether mechanically operated or not, designed exclusively or mainly for domestic use, and parts thereof, the following:—Dish washers, drying cabinets and drying machines, washing machines and washers excluding washing machines and washers which are designed for heating water by electricity or gas but which are not otherwise designed for operation by electricity or gas, ironing machines and irons, floor polishers, vacuum cleaners, refrigerators having a storage capacity not exceeding 12 cu ft, machines for mixing, extracting and preparation of food and drink, electric kettles and other cooking utensils incorporating heating elements, including electric hotplates; dry shavers, electrically operated, sewing machines, knitting machines, hair drying machines, electric blankets, generating plant.

Clocks and watches.

Goods on which minimum deposit is 10 per cent, with four years to pay are:

Washing machines and washers which are designed for heating water by electricity or

gas but which are not otherwise designed for operation by electricity or gas, including wash boilers and coppers.

Cookers, including solid fuel cookers, designed exclusively or mainly for domestic use.

Water heating appliances.

Electrical Goods to which the Hiring Order Applies

Radio receiving sets and television receiving sets (including portable sets and sets designed for use in road vehicles), whether or not assembled and whether or not complete; television aerials, cathode-ray tubes, loudspeakers and television conversion units; gramophones, radio-gramophones, record players and juke boxes, tape recorders.

Space heating installations and appliances of a kind designed exclusively or mainly for domestic use.

Appliances and apparatus, whether mechanically operated or not, being appliances or apparatus of a kind designed exclusively or mainly for domestic use, the following:—Dish washers, drying cabinets and drying machines, washing machines and washers excluding washing machines and washers which are designed for heating water by electricity or gas but which are not otherwise designed for operation by electricity or gas, ironing machines and irons, floor polishers, vacuum cleaners, refrigerators having a storage capacity not exceeding 12 cu ft, machines for mixing, extracting and preparation of food and drink, electric kettles and other cooking utensils, incorporating heating elements, including electric hotplates; dry shavers, electrically operated, knitting machines, hair drying machines.

Financial Section

STOCKS and SHARES

STOCK EXCHANGE markets became rather busier and more cheerful for a time following the announcement of the new credit restrictions. Neither the curb on the banks' lending powers nor the tightening of the hire-purchase regulations were any more formidable than had previously been apprehended, and the termination of a period of suspense came as a relief. However, the recovery movement seemed to have little steam behind it. Previous falls in shares connected with domestic equipment and other goods popularly sold on a hire-purchase basis had been decidedly heavy, and these sections were correspondingly quick to rally. Gilt-edged stocks became a little firmer on the view that the banks were unlikely to be forced by the new "special deposit" regulation into selling their holdings of Government bonds on any large scale.

A.E.I.

Associated Electrical Industries £1 shares have continued to receive firmer support on the strength of the references by Lord Chandos, at the annual meeting, to larger demands for the group's products, to the prospect of improved trading results and to the expectation of better contributions in future from the recently least satisfactory divisions. After moving up 3s 6d to 55s, the shares still offered a yield of nearly 5½ per cent. The shares of C. A. Parsons and A. Reyrolle have also been attracting more attention in the light of the agreements for co-operation between these companies and A.E.I., and the interchange of certain shareholdings. At prices of 47s 6d and 78s 6d the yields are respectively just under 4 and 4½ per cent on the basis of decidedly conservative rates of dividend, the fourfold cover for the C. A. Parsons payment being especially wide. The agreements by which Reyrolle receives 1½ million A.E.I. shares in exchange for half Reyrolle's shareholding in C. A. Parsons create a financial link between the three groups.

Better Prices

Among domestic equipment investments, Hoover 5s shares, at 49s 3d, recovered during the week 4s 3d of the ground lost during the period of uncertainty preceding the decision on hire-purchase controls. Vactric too

recorded a useful gain to 35s, but otherwise the rise of prices in this section did little more than cover earlier recessions. In addition to the relatively large improvement in A.E.I., shares of the other major electrical groups, including G.E.C., English Electric and

Crompton Parkinson, showed modest gains, while among cable issues B.I.C.C. moved up 1s to 55s. Babcock & Wilcox were steadier at the level of 37s to which they had been reduced earlier by news of the severe reduction in the profits and dividend for 1959,

Price Changes in

Company or Board	Nom. Value	Middle price 2nd May	Week's Rise or Fall	Dividend		Yield %	1960	
				Pre-vious	Last		High-est	Low-est
Gilt-edged Stocks						£ s d		
Brit. Elec. 1968/73	100	75½	—½	3	3	3 19 6	79½	75½
Brit. Elec. 1974/77	100	72½		3	3	4 2 9	76	72½
Brit. Elec. 1976/79	100	75½		3½	3½	4 12 9	79½	75½
Brit. Elec. 1974/79	100	85½		4½	4½	4 19 6	90½	85½
Overseas Electric Supply								
Calcutta Elec.	£1	20/6		6-8†	7†	11 3 0	20/9	19/3
East African Power	£1	16/-		7½	8	10 0 0	20/3	16/-
Nigerian Elec.	£1	15/6	—1/-	8	8	10 6 6	19/9	15/6
Perak Hydro-Elec.	£1	16/6		10	5	6 1 3	17/9	15/3
Electrical Shares								
Aberdare Holdings	5/-	15/6	—3d	17½	17½	5 13 0	19/-	15/6
Aerialite	1/-	7/9		54	54	6 19 3	9/6	7/9
Allen, W. H.	£1	53/9	—2/6	11	12	4 9 3	60/-	53/9
Allied Insulators	5/-	20/-	—1/-	—	20	5 0 0	23/3	20/-
Anglo-Portuguese Tel.	£1	27/6	+6d	9	9	6 11 0	28/6	26/-
Aron Elec. Ord.	£1	62/-		15	15	4 16 9	62/-	47/-
Assoc. Elec. Ord.	£1	55/-	+3/6	15	15	5 9 0	66/6	50/6
Automatic Tel. & El.	5/-	19/-		17	17½	4 9 6	21/9	71/3
Babcock & Wilcox	£1	37/-		13	9	4 17 3	48/9	33/6
Bakelite	10/-	47/-	—6d	15	17½	3 14 6	48/9	40/-
Baldwin, H. J.	2/-	2/3		20	—	—	2/6	2/3
Berry's Electric	5/-	35/-		10	20*†	2 17 3	38/-	29/6
Bowthorpe Holdings	2/-	9/9	—3d	25	27	3 6 9*	11/6	9/9
British Elec. Traction:								
Def. Ord. "A"	5/-	45/-		25	35	3 17 9	49/3	42/3
B.I. Callender's	£1	55/-	+1/-	13½	13½	4 18 3	61/-	50/-
B.I. Callender's 6% Pref.	£1	20/-		6	6	6 0 0	21/-	19/9
British Thermostat	5/-	21/3		30	35	4 2 3*	26/-	21/3
Brook Motors	10/-	46/9		25	25*	4 12 6*	53/6	46/9
Bulgin, A. F.	1/-	10/-x.c.	+3d	50	55	3 13 3*	10/3	8/-
Bulpitts	5/-	17/9	—3d	15	16½	4 11 6	23/3	17/9
Burco Dean	5/-	13/-		16	18	6 18 6	15/9	13/-
Cable & Wireless:								
Ord.	5/-	15/3		10	10*†	3 5 6	18/3	14/3
4% Loan	100	96		4	4	4 3 3	96	94½
Chloride El. Storage "A"	£1	71/3		20	17½*	4 18 3	74/-	65/6
Clarke Chapman	£1	51/6	+1/6	13½	13½	5 6 9	63/6	48/9
Cole, E. K.	5/-	23/3	—1/-	17½	20	4 6 0	31/9	23/3
Contactar Switchgear	5/-	16/6		14	14	4 4 9	17/9	15/9
Cossor, A. C.	5/-	7/6		Nil	5	3 6 9	10/-	7/6
Crabtree	10/-	24/-	—3d	20	22½†	4 13 9*	28/3	24/-
Crompton Parkinson	5/-	12/3	+3d	12	14	4 11 6*	15/-	12/-
Davis & Timmins	5/-	27/6	—6d	20	25	4 11 0	28/9	21/-
De La Rue	10/-	62/-	—2/-	17½	20	3 4 6	73/6	62/-
Decca "A"	10/-	45/6		50	20*	4 8 0	51/3	44/6
Desoutter	5/-	42/-		21½	30	3 11 6	41/-	37/6
Dewhurst	2/-	7/9		20	20	5 0 0	8/6	7/6
Dictograph Tel.	2/-	13/-	+3d	20	20	3 1 6	13/3	12/-
Dimplex	5/-	31/3		—	25†	4 0 0	32/6	26/9
Dubilier Condenser	1/-	6/-		20	25	4 3 3	6/-	5/-
Dupont	5/-	22/6	—1/6	12½	17½	3 17 9	30/3	22/6
E.M.I.	10/-	47/6	—1/9	20	14*†	2 18 9	58/9	46/-
Electrical Apparatus	5/-	15/-	+1/9	14½	14½	4 16 9	15/-	12/9
Electrical Components	5/-	10/3	—6d	12½	15	4 17 6*	13/9	10/3
Elec. Construction	£1	37/6		8½	9	4 16 0	43/-	35/3
Elliott-Automation	5/-	22/-		—	9-3*	2 2 0	25/-	19/9
Enfield Rolling Mills	£1	49/-	—1/-	15	15	6 2 6	56/3	49/-
English Electric	£1	40/-	+6d	14	10*	5 0 0	53/-	39/6
English Electric 3½% Pref.	£1	12/6	—3d	3½	3½	6 0 0	13/-	12/6
Ericsson Tel.	5/-	22/6		13†	13†	4 14 3	28/6	22/6
Ever Ready	5/-	23/9		20	27†	3 9 0*	27/3	23/9
Falk Stadelmann	£1	32/-	—1/6	10	10	6 5 0	35/9	32/-

The above quotations are based upon middle prices in the Stock Exchange Daily Official List.

* After scrip issue.

† Free of income tax.

‡ Dividend indicated.

and there were gains by Clarke Chapman, International Combustion and other heavy engineering issues.

Mixed Changes

Plessey receded further from 48s to 45s before recovering to 46s, while

Ward & Goldstone at 52s 6d and a number of other electrical shares lost some ground on balance, but the lists were showing a majority of moderate net improvements by the beginning of this week. A. F. Bulgin were quoted ex the 50 per cent scrip issue and a

Electrical Investments

Company or Board	Nom. Value	Middle price 2nd May	Week's Rise or Fall	Dividend		Yield %	1960		
				Pre-vious	Last		High-est	Low-est	
Electrical Shares—continued							£	s	d
G.E.C.	£1	38/9	+9d	10	10	5 3 3	47/6	37/6	
G.E.C. 6½% Pref.	£1	21/-		6½	6½	6 3 9	22/3	21/-	
General Cables	5/-	6/-	-3d	15	Nil	—	10/-	6/-	
Goblin (B.V.C.)	5/-	10/3	-1/-	7½	12½	6 2 0	13/9	10/3	
Greenwood & Batley	£1	125/-		20	20	3 4 0	125/-	120/-	
Hackbridge Holdings	5/-	15/6		20	20	6 9 0	17/3	15/-	
Hackbridge & Hewittic	5/-	14/3	+3d	20	20	5 5 3*	15/-	13/-	
Head Wrightson	5/-	23/6	+9d	20	14½*	2 19 6	31/6	22/6	
Heatrae	2/-	11/6	-3d	20	20	3 9 6	11/9	8/9	
Holophane	5/-	19/-		22½	26	6 16 9	20/6	17/6	
Hoover	5/-	49/3	+4/3	60	90	4 11 6*	55/-	45/-	
I.C.I.	£1	58/-	+2/6	8	11½	3 17 6	62/9	55/6	
Intl. Combustion	5/-	28/6	+2/-	30	30	5 5 3	46/9	26/6	
Intl. Computers & T.	£1	63/-	+6d	—	10	3 3 6	78/6	62/-	
Johnson & Phillips	£1	20/6		5	5	4 17 6	24/-	20/6	
Laurence Scott	5/-	18/9	-9d	15	15*	4 0 0	25/3	18/-	
Lister, R. A.	£1	58/9		12½	14	4 15 3	62/-	53/9	
Lucas, J.	£1	71/3	-1/3	10	12½	3 10 3	74/6	71/3	
Marconi Marine	£1	46/3		10	10	4 6 6	46/3	42/6	
Marryat & Scott	2/-	15/3	-3d	37½	22½*	2 19 0	16/9	14/3	
Mather & Platt	£1	52/6		10½	11	4 1 9	59/-	50/9	
Metal Industries	£1	67/6	-6d	14	15½	4 9 0	76/3	63/6	
Midland Elec. Mfg.	£1	57/6		10	12	4 3 3	57/6	53/6	
Morphy-Richards	4/-	20/6		20	25	2 8 9*	21/6	16/3	
Murex	£1	67/6	+5/-	17½	15	4 9 0	77/-	62/6	
Newman Ind.	2/-	5/3	+3d	10	12½	4 15 3	5/3	4/-	
Oldham & Son	1/-	2/9		17½	17½	6 7 3	3/-	2/9	
Parsons, C. A.	£1	47/6	+1/6	8½	9½	3 19 0	59/-	46/-	
Philips' Lamps	Fl. 10	177/6		13.3	16	1 16 0	180/-	137/-	
Plessey	10/-	46/-	-2/-	20	14½†	3 1 0	54/6	44/6	
Pye	5/-	16/9		12½	12½*†	3 14 9	19/-	16/9	
Pyrotexax	5/-	55/-		—	34	3 2 0	55/-	44/3	
Radiation	£1	40/6		6	12	5 18 6	44/6	34/6	
Reliance Clifton	5/-	22/-	-1/-	15	15	3 8 3	28/-	22/-	
Reyrolle	£1	78/6	-1/6	17½	17½	4 9 3	104/6	78/6	
Rheostatic	4/-	22/-	+9d	12½	20	3 12 9	22/-	16/6	
Richardsons Westgarth	10/-	11/-	+3d	8½	8½	7 11 6	14/9	10/9	
Simon-Carves	5/-	49/-	+2/6	25	35	3 11 6	54/-	36/-	
Smith (England), S.	4/-	16/-	-1/-	12½	17½	4 7 6	20/-	16/-	
Southern Areas	£1	14/6	-6d	Nil	Nil	Nil	15/3	13/-	
Strand Elec.	5/-	16/-		15	20	6 5 0	20/3	16/-	
Sturtevant	5/-	16/3		15†	15†	7 11 0	24/3	16/3	
Sun Elec.	5/-	15/3		25	15*	4 18 3	16/3	15/-	
Switchgear & Cowans	5/-	16/6	-9d	15	17½	5 6 0	18/9	16/-	
T.C.C.	10/-	72/6		25	35	4 16 6	72/6	55/9	
Telephone Mfg.	5/-	6/-	+9d	10	10	8 6 9	7/3	5/-	
Telephone Rentals	5/-	18/6	+1/-	12½	15*	4 1 0	19/9	17/-	
Thompson (John)	5/-	18/9	+1/6	25	25	6 13 3	25/9	17/3	
Thorn Elec.	5/-	46/3		17½	20	2 3 3	55/6	44/3	
Thornycroft	£1	23/9		7½	6	5 1 0	31/-	23/3	
Tube Investments... ..	£1	77/6	+6/3	20	13†	3 8 9	95/6	65/3	
Vactric	5/-	35/-	+1/-	25	37½	5 7 3	43/9	34/-	
Walsall Conduits	4/-	14/9		22½	22½	3 9 0*	16/-	14/3	
Ward & Goldstone	5/-	52/6	-1/-	25	30	2 17 3	59/3	51/6	
Watford	2/-	12/3		25	25	4 1 9	17/6	11/-	
Westinghouse	£1	50/-		10	11	4 8 0	59/9	49/9	
West, Allen	5/-	13/6	-9d	12½	12½*	4 12 6	17/-	14/-	
Wolf Electric	5/-	11/6		10	12½	5 8 9	13/3	10/9	

few pence higher, at 10s, and dealings began in Ultra Electric new shares at a premium of 1s 3d on the "rights" issue price of 19s. Rheostatic, which were outstandingly well supported throughout the period of market weakness, remained very firm at 22s in advance of the one-for-three scrip distribution, and Murphy Radio were steady around 17s 9d after the preliminary advice of coming issues of preference and ordinary shares to a value of about a million pounds: details may be expected towards the end of this month.

Elliott-Automation

A final dividend of 6 per cent from Elliott-Automation brings the total for 1959 to the equivalent of 9½ per cent (allowing for a scrip issue) and leaves the return on the 5s shares, quoted around 22s, at no more than 2½ per cent. In investment calculations the current yield on the shares has long been accorded very minor importance in comparison with the growth potentialities with which the fields of automation and electronics are credited. In that respect confidence was fortified by the rate of expansion shown by the company's preliminary profits statement for 1959. The net profit of £599,000 (after tax) is almost exactly £100,000 better than the previous figure, and the board is expecting to see marked progress again in the year now running.

Company News

Tube Investments produced a pleasant surprise in announcing an increase in the interim dividend for the current year from 7½ to 8½ per cent. At the time of the recent big issue of new shares (which do not rank for the interim distribution) the company forecast a final payment of not less than 8½ per cent on the doubled capital, so that the market is encouraged now to look for a minimum total equivalent to 13 per cent, and to hope tentatively for something better than that. The price of the £1 shares improved by 6s 3d to 77s 6d. Pressed Steel 5s shares have been rather heavily depressed since the first announcement of a "rights" issue of over 7 million new shares at 30s each. Having been quoted up to 45s in the early part of the year, they stood at 34s just before the allotment letters were due to go out.

T.S. "Empress of Canada"

Laurence, Scott & Electromotors, Ltd., has supplied 100 electric motors (totalling over 4,000 h.p.) for driving various auxiliaries on T.S. *Empress of Canada*. Ten cargo winches have also been supplied.

REPORTS and DIVIDENDS

Switchgear & Cowans, Ltd.—The annual meeting was held on 28th April, Mr. J. L. Rowbotham (chairman) presiding. In their report covering the year 1959, the directors stated that the increase of 27 per cent in the profit, as compared with the previous year, reflected improvement in both the parent company and the subsidiaries. After dealing with the activities of the subsidiary companies, the report states that about the middle of 1959 it became apparent that the development of the new site at Broadheath would have to be commenced in order to handle the increasing sales. Work was progressing well, but it was not expected that any plant fixtures or fittings could be installed until after June or July this year, so that they would not reap any great benefit from this until 1961.

The order book was satisfactory and they confidently expected to work at full output in all sections throughout the year. Technical progress continued. The new range of medium and high voltage designs mentioned in last year's report had been successfully proved and pilot production commenced. The new gear had now to be introduced into the main production flow without adversely affecting its volume. Whilst no spectacular advance was expected during 1960, the results should at least equal those of 1959.

Elliott-Automation, Ltd.—The group profit for 1959 amounted to £1,363,187, as compared with £1,125,723 for 1958, and after providing £347,557 for depreciation and £466,755 for taxation, the net profit is £548,875 (against £458,628). It is proposed to pay a final dividend of 6 per cent on capital as increased by a one-for-five rights issue and a subsequent one-for-five free issue, making with the interim dividend of 4 per cent on the former capital, a total of 10 per cent for the year (unchanged).

Franco Signs, Ltd.—The annual meeting was held on 26th April, Mr. E. J. Tucker (chairman) presiding. In his review of 1959, the chairman said that all the company's subsidiaries had had a successful year. The Franco-British Electrical Co., Ltd., continued to maintain a leading place in the production of all types of signs for advertising purposes. A new service for national advertisers was now in operation throughout Great Britain whereby the company undertook the manufacture, siting, installation and maintenance of point-of-sales signs on

retailers' premises. The extension of the factory at Colindale had been completed since the date of the accounts and the whole of the manufacture at present being carried out at Boreham Wood would shortly be transferred to Colindale.

Franco Traffic Signs, Ltd., obtained the main Ministry of Transport contract for signs on the new motorway, M1. Since the date of the accounts the order book had been satisfactorily maintained, but with keen competition and the recent national agreement on reduction of hours of work, they were faced with increasing costs which, however, they would endeavour to offset by increasing efficiency and economy of working.

The National Electric Construction Co., Ltd., reports that after providing £87,739 for taxation the group net profit for 1959 is £121,871, as compared with £104,876 for 1958. It is proposed to pay a dividend for the year of 20 per cent (against 17½ per cent).

Murphy Radio, Ltd., is to raise fresh capital by the issue of 500,000 new £1 preference shares and by a rights issue of ordinary shares which will raise approximately £500,000. The new preference shares will rank *pari passu* with the existing 5½ per cent preference shares in all respects save that the dividend, which will be fixed shortly before the time of the issue, will be at a higher rate. It is also proposed to increase the rate of dividend on the existing preference shares to 5¼ per cent and to alter the rights. Mr. E. J. Power (chairman) states that the issues are being made in view of the increasing activity and diversification of the group. Full details of the proposed issues will be announced shortly after the extraordinary meeting to be held on 23rd May.

Ultra Electric (Holdings), Ltd.—At an extraordinary general meeting held on 26th April approval was given to an increase in the authorised capital from £750,000 to £1,000,000 by the creation of 1,000,000 ordinary shares at 5s each. Ordinary shareholders are being offered 990,500 of the new shares in the ratio of one-to-three at 19s per share. The remaining 38,000 are being offered to employees of the company.

Telephone Rentals, Ltd., reports that after providing £426,728 for taxation, the group net profit for 1959 is £837,503, as compared with £682,422 for the preceding year, of which £833,627 is attributable to the holding

company. General reserve receives £430,632, and tax equalisation reserve £77,600. It is proposed to pay a final dividend of 10 per cent, making 15 per cent for the year (against an equivalent of 11½ per cent after allowing for a one-for-five scrip issue).

Sturtevant Engineering Co., Ltd.—Although group profits fell from £527,645 in 1958 to £273,840 in 1959, and the net balance from £265,620 to £148,438, the dividend for the year is maintained at 15 per cent, tax free, with an unchanged final dividend of 12 per cent.

Power Securities Corporation, Ltd.—A group net profit of £626,473 is reported for 1959, as compared with £520,432 for 1958. A participating dividend of 3 per cent is paid on the preference capital, making 10 per cent (8½ per cent) for the year, and the ordinary dividend is raised from 11 per cent to 15 per cent.

Tube Investments, Ltd., has declared an interim dividend of 8½ per cent (against 7½ per cent).

Contactar Switchgear, Ltd., has declared an interim dividend of 4 per cent (unchanged).

Bankruptcies

H. R. Jowett, formerly carrying on business with another as J. and L. Domestic Supplies Co., at 60, Church Road, Upper Norwood, London, S.E.19, as electrical appliance retailers.—Application for discharge to be heard on 30th June at the County Court, Scarbrook Road, Croydon.

G. R. Overton, Rockland All Saints, Attleborough, Norfolk, radio and electrical engineer.—First dividend of 6s 8d in the £, payable at the Official Receiver's Office, Norfolk House, Exchange Street, Norwich.

L. C. Sampson and E. C. Tubbs, carrying on business in co-partnership as Electro Radio Stores at Fore Street, Gunnislake, Cornwall.—Second dividend of 3s 4d in the £, payable at 2, Serjeant's Inn, London, E.C.4.

F. E. Thorne, electrician, 44, Cranhurst Road, Cricklewood, London, N.W.2.—Application for discharge to be heard on 17th May at Bankruptcy Buildings, Carey Street, London, W.C.2.

N. Sherman and B. Bercovici, lately trading together as B.B. Radio and Television Service, and B.B. Radio, at 168, Roman Road, London, E.2, radio, television and electrical equipment dealers.—Last day for receiving proofs for dividend 12th May. Trustee, Mr. A. W. Hunter, Walter House, 418-422, Strand, London, W.C.2.

B. Bercovici (separate estate).—First and final dividend of 20s in the £, payable at Walter House, 418-422, Strand, London, W.C.2.

Liquidations

Manuus Manufacturing Co., Ltd., switchgear manufacturers, 270, Bearwood Road, Smethwick, Staffs.—Winding up voluntarily. Liquidator, Mr. D. Grant, 44, Knightlow Road, Harborne, Birmingham, appointed 12th April.

Easiway Electrical Co., Ltd., electrical, radio and television dealers, 68, Gorton Cross Street, Gorton.—Winding up voluntarily. Liquidator, Mr. L. H. Shipton, 31, Lloyd Street, Manchester, 2, appointed 22nd April.

RED SPOT FUSEBOARDS

with built-in CIRCUIT SWITCHES

All the exclusive safety features of the well-known 'Red Spot' range of fusegear, **PLUS** built-in circuit switches, have been incorporated in this **NEW** design.

Available in both Single Pole & Neutral and Double Pole, with 4, 6, 8, 10 or 12 ways.

DELIVERY EX STOCK.

For further information write for PUBLICATION FG/147 to:

The **ENGLISH ELECTRIC** Co. Ltd.,
Fusegear Division,
East Lancashire Road,
Liverpool, 10



'ENGLISH ELECTRIC'

fusegear

THE **ENGLISH ELECTRIC** COMPANY LIMITED, MARCONI HOUSE, STRAND, LONDON, W.C.2
WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

IT'S HERE!

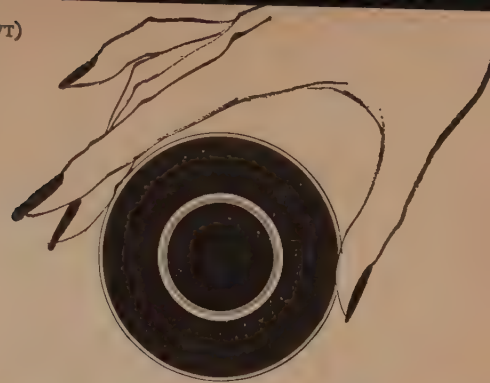
Revolutionary new



Compare in every way
with other Washing Machines
and you'll see
the new LIBERATOR will
prove the greatest seller
in your showroom history!

ENGLISH

Dial-the-Fabric'



LIBERATOR

the washing machine that out-dates all others

QUINELY AUTOMATIC

housewife just sets the dial, switches on, and the
 ator does the rest—all by itself • it heats the water •
 es • rinses • spin-dries • and switches off!
can even be out shopping!
easy to install. No special plumbing needed!

CLUSIVE 'DIAL-THE-FABRIC' PRE-SELECTOR

ings — one for every type of fabric.

HEAVILY SOILED CLOTHES

WHITE, COLOUR FAST COTTONS

ROBUST NYLON, TERYLENE

COLOURED COTTONS, LINENS

WOOL BLANKETS, RAYONS, SILK

DELICATE SYNTHETIC FABRICS

TLE TUMBLE ACTION

ED SUPERIOR BY ENGLISH ELECTRIC RESEARCH
 es more thoroughly—more evenly—more gently
CLOTHES LAST LONGER TOO!

ELECTRIC'

SKY'S-THE-LIMIT PROMOTION

Biggest-ever by ENGLISH ELECTRIC

- Multi-million audience T.V. campaign
- Multi-million circulation press advertising
- New colour film for your local cinema
- Exciting point-of-sale material
- Dramatic direct mail literature
- Hundreds of 'live' demonstrations across the country
- New sales training film for your staff

BEST-EVER PRODUCT—

BIGGEST-EVER PROMOTION

The Liberator is dramatically ahead of the field. It's backed to the limit by the most powerful promotion ever launched by ENGLISH ELECTRIC. Now it's up to you!

Display it! Demonstrate it! Use to the fullest every one of ENGLISH ELECTRIC's sales-aids. The more hard sell you put in, the more hard cash you'll take out. Order now! Don't miss a single sale!

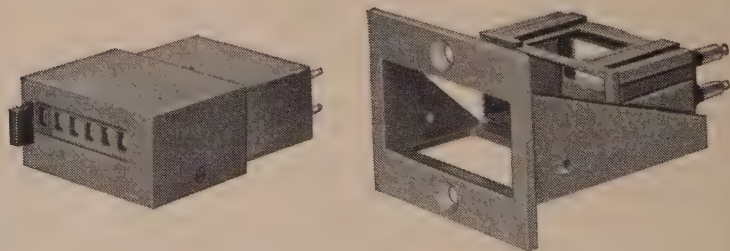
This new counter is fast, compact, reliable—costs less

**Series F.43 magnetic counters
will operate up to
3,000 counts per minute
—are reliability proved over
400 million operations and,
even with electrical reset,
are smaller than
most counters
of comparable performance.**



Unequalled electrical and mechanical flexibility is now available at a price competitive with lower performance counters. Six digit indication, optional pushbutton or electrical reset and a wide selection of preferred operating voltages minimise application problems.

Compact size, plug-in diecast construction, socket-box dovetailing design and accessories such as optional flush mounting frame simplify installation and offer unequalled flexibility for individual or multiple installations in desks, panels and mimic diagrams.



Flexibility shown by plug-in flush mounting and dovetailed stack

The Hengstler Series F.43 electro-magnetic counter (patents pending) is manufactured in Western Germany by J. Hengstler K.G., Sole agents for this counter in the U.K. are

LANCASHIRE DYNAMO ELECTRONIC PRODUCTS LIMITED

CD.1

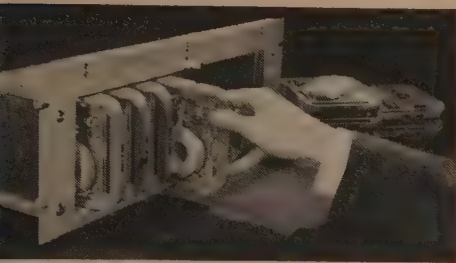
RUGELEY • STAFFORDSHIRE • ENGLAND

Manufacturers of the world's widest range of industrial electronic control equipment

NEW ELECTRICAL EQUIPMENT

Magnetic Logical Elements and Sensing Devices

A range of contactless sensing devices and magnetic logical elements is announced by the ENGLISH ELECTRIC CO., LTD., Marconi House, Strand, London, W.C.2. The logical elements are in the form of mechanically coded standard packages, from which any control scheme may be built up. The



English Electric magnetic logical elements

element is a plug-in unit consisting of a red nylon frame moulded to form a handle at one end and having a 32-way plug and socket connection at the other. Two printed circuit component boards, one for input circuit components and the other for the magnetic circuit components, are fixed into this frame and electrical connections are taken to the plug.

Each assembly is a complete logical element providing "and," "or," "not," "memory" and "time delay." The control scheme is arranged by the wiring to the plug sockets. The range of contactless sensing devices are known as pick-offs and include magnetic push-buttons, magnetic limit switches, proximity limit switches, linear differential transformers, rotary switches and tacho-generators.

Electric Kettle

METWAY ELECTRICAL INDUSTRIES, LTD., Canning Street, Brighton, 7, have added to their "Miniway" range of 2 pint electric kettles a new model



Metway "Miniway Rex" 2 pint electric kettle

known as the "Miniway Rex." It is available in non-automatic and automatic versions and the finish is polished aluminium. The respective prices are £2 2s 3d plus 7s 7d purchase tax (non-automatic) and £2 7s plus 8s 6d purchase tax (automatic). The company also announce that they will shortly be offering a 12 V car kettle in a similar design.

Direct-reading Oscilloscope

The type 425 oscilloscope manufactured by the Allen B. Du Mont Laboratories of New Jersey and now available in this country from LELAND INSTRUMENTS, LTD., Abbey House, Victoria Street, London, S.W.1, incorporates a direct digital reading system. It is a high frequency instrument for use from d.c. to 60 Mc/s and is built

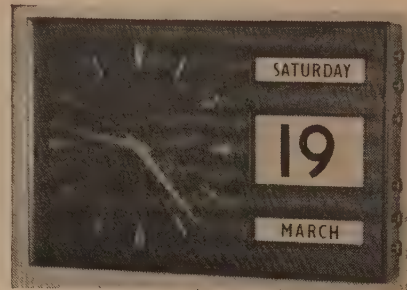


Leland Instruments digital reading oscilloscope

on the modular constructional system, a variety of plug-in units being available which enable the range to be varied and extended. The instrument may be connected directly to punched-card equipment for recording and analysis. Power requirements are 1,000 W at 60 c/s, 115 V. It is also available for 48 to 450 c/s power sources.

Calendar Clock

The latest addition to the standard range of wall clocks for commercial use to be introduced by ENGLISH CLOCK SYSTEMS, 179-185, Great Portland Street, London, W.1, is a calendar clock. Suitable for such places as banks, booking halls, reception lounges, etc., the model incorporates a gin dial and a bold calendar. The case is constructed with solid



English Clock Systems calendar clock

mahogany sides and mahogany veneered plywood face and the knobs for turning the calendar rolls project from one side. It measures 11¼in high by 17¼in wide by 2½in deep and may be supplied fitted with a self-starting synchronous movement for connection to an a.c. supply or with an impulse movement to operate from a master clock. The price is £18 5s plus £3 8s 5d purchase tax.

Silent Contactors

The latest addition to the range of silent mercury switch contactors made in sizes up to 200 A, 440 V by JOHN BAGGS & CO., Relay Works, Station Road, Uppermill, near Oldham, Lancs., is a 30 A triple pole and neutral contactor in a moulded case of the electricity meter type. The connections are brought out in a manner similar to those of a three-phase four-wire meter. A 60 A t.p. and n. contactor is also available in the same case. All coils are vacuum impregnated, and silicone



John Baggs silent contactor

elastomer insulated leads are used throughout, the bearings do not need lubrication and the contactors are intrinsically silent both when switching on and when closed.

Coil Winding Machine

The automatic winding machine for field coils being made by W. Aumann KG. of Germany is now available

from the sole U.K. agents, R. H. COLE (OVERSEAS), LTD., 2, Caxton Street, Westminster, London, S.W.1. The coil is wound by a rotating wire guide attached to a face plate and, after winding, it is automatically taped at the sides and subsequently ejected. The coil formers are fitted to an indexing table and these operations take place simultaneously at different stations. Similar fully automatic machines are available for all types of former wound and unsupported coils. The prices are from £1,400 for the automatic model and from £900 for semi-automatic types.

Latest Nettle Accessories

The range of electrical accessories manufactured by NETTLE ACCESSORIES, LTD., Harper Road, Wythenshawe, Manchester, 22, has been increased with the introduction of a 4-way bedside adaptor for 13 and 15 A socket outlets; contemporary styled ceiling roses; and a range of contemporary lampholders.

With the adaptor a variety of bedside electrical fittings—electric blanket, clock, radio or reading lamp—can be connected safely and without the danger of overloading. Each adaptor is fused and shuttered and has four 5 A 2-pin plugs. It is for use with 2-core cable appliances only and the fuses are easily replaceable.

The respective prices of the adaptor, with the four 5 A plugs, are:—

Nettle Accessories "1000" range of lampholders and battenholders and (right) a 13 A bedside adaptor



13 A, brown, 14s 11d; 13 A, ivory, 16s 11d; 15 A, brown, 16s 11d; 15 A, ivory, 18s 11d.

The ceiling roses are available as two- or three-plate types and also with looping terminals. All are fitted with porcelain interiors. They serve as a combined block and ceiling rose, dispensing with the need for wood blocks. The fixing centres are at 2in and the finish is brown or ivory. The prices range from £1 7s per dozen for two-plate, automatic cord grip types, in brown, to £2 3s per dozen for three-plate roses with gland type cord grip for t.r.s. flexible in ivory. They are claimed to conform fully to I.E.E. Regulation 207G.

The lampholders and battenholders are known as the "1000" range and are available in black, white and dove-grey. All types have a stout brass lampholder barrel riveted to the interior and are in accordance with the latest supplement to B.S. 52. The

interiors are coarse threaded to obviate thread binding. The prices are competitive and a complete price list is obtainable from the manufacturers.

British Engineers' Handbook

The 31st edition of "The British Engineers' Handbook" has recently been published by the British Engineers' Association (Inc.), 32, Victoria Street, London, S.W.1, price 21s. This is an annual classified handbook of members, their manufactures, trade names and trade marks, and is indexed in Portuguese, French, German and Spanish. A section listing members alphabetically gives full names and addresses, details of their range of products and such additional information as branch offices, overseas agents, subsidiary companies, etc. The products are also classified in another section.

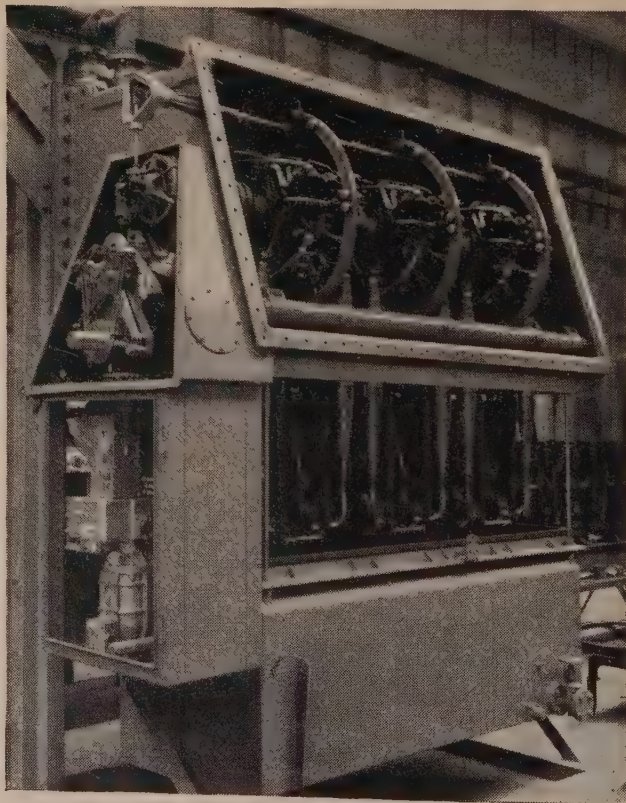
Transformer Tap-Changer

A high-speed resistor transformer tap-changer developed by the ENGLISH ELECTRIC CO., LTD., Marconi House, Strand, London, W.C.2, is capable of a minimum of 200,000 operations, without maintenance to contacts or mechanism, on system voltages up to 500 kV and currents up to 1,000 A. Tappings are changed in one half cycle, i.e. 0.06 sec. Half cycle operation is possible up to 200 per cent rated load and satisfactory operation is achieved at 300 per cent rated load on power transformer duty. Operation is by a charged spring released by a driving motor or, in emergency, by hand. The non-inductively wound ribbon transition resistors are mounted in ceramic supports in the diverter switch tank.

Complying with the C.E.G.B. specification and the Continental voltage test requirements, it can withstand an

impulse level of 350 kV and a graded impulse level of 430 kV. The selector and diverter switches can operate satisfactorily at temperature extremes of +90°C and -20°C. The transition resistances will withstand 50 continuous tap changes and full-load current for five minutes.

English Electric high-speed tap-changer



DOMESTIC ELECTRICAL
EQUIPMENT

REFRIGERATORS

LAST year the sales of domestic refrigerators in this country reached an all-time record; nearly 850,000 were sold, almost twice the previous year's total. The exceptionally fine summer of last year, combined with the withdrawal of hire-purchase restrictions (now in part reimposed), may well have accounted for much of this increase but it is, nevertheless, a fact that the refrigerator industry has continued to progress, even during the winter months. This is reflected in recent figures issued by the Domestic Refrigeration Development Committee, which show that during February the sales of British-made domestic refrigerators, compared with a similar period in 1959, increased by 128 per cent.

The number of manufacturers and distributors has also grown and there are now more new firms, and new models, than at any other time. Many of the new refrigerators are imported models, chiefly from the Continent, but several British manufacturers have entered the market for the first time.

As the following survey shows, the majority of refrigerators are of the compressor type and most models carry a guarantee on the unit for five years. The absorption, or "silent" type, of refrigerator is, of course,

equally reliable. The outstanding features of the 1960 range of refrigerators are their simple and sleek exterior design and the skilful arrangement of the interior fittings, enabling every inch of storage space to be utilised. This is achieved by the increased use of plastics for the actual interiors, adjustable shelves and special compartments built into the door linings. Many also have increased space for the storage of frozen foods and the ice-making compartments have been enlarged.

Table-top types in the medium-size range (approximately 3 to 5 cu ft) are still the most popular choice and there is also a noticeable trend towards the smaller (approximately 2 cu ft) refrigerator suitable for wall mounting where kitchen space may be at a premium. White appears to be the generally accepted finish favoured by most manufacturers, although several offer cream as an alternative and, additionally, provide table tops in a variety of colours.

A fee, usually between £2 and £3, is charged by some manufacturers to cover installation. Where this is the case the sum has been added to the retail price and all prices shown in the following survey include such additions.

COMPRESSOR

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
ADA (HALIFAX), LTD., Johnson Street, Halifax.	"Ada Slendaline"	4.5 cu ft 9.4 sq ft	36×21½×24½	Interior light, rubber rollers, plastic interior	White or cream stoved enamel	£53 5 3	£9 14 9
A.E.I.-HOTPOINT, LTD., 33, Grosvenor Place, London, S.W.1.	Hotpoint "Iced Diamond" E.37	3.7 cu ft 7.1 sq ft	36×21×21	Interior light, mounted on rollers, L. or R.H. door opening inner door panel with egg & bottle racks, etc.	White or cream, with optional red, blue, green, white or cream vitreous enamel table top	£50 14 3 £2 17 7 (Table top)	£9 2 9 £0 5 5
	Hotpoint "Iced Diamond" E.50	5 cu ft 9.7 sq ft	36×24×24			£59 11 2 £2 13 0 (Table top)	£10 15 10 £0 10 0
H. J. BALDWIN & CO., LTD., Domestic Appliance Division, 205-7, Great Portland Street, London, W.1.	"Baldwin" 41	4.1 cu ft 7.2 sq ft	33½×24×22½	Plastic interior, table top	White stoved enamel	£44 0 0	£7 19 6
	"Baldwin Atlantic" 57	5.7 cu ft 10.3 sq ft	48×22×23½	Interior light, vit. enamel interior, blue plastic door liner, safety door catch		£75 12 0	£13 13 0
	"Baldwin Atlantic" 68	6.8 cu ft 11 sq ft	52×24½×24			£84 10 0	£15 5 0
	"Baldwin Atlantic" 74	7.4 cu ft 11.8 sq ft	53½×24½×24			£93 8 0	£16 17 0
BAUKNECHT (G.B.), LTD., 1-9, Dover Yard, Berkeley Street, London, W.1.	"Beekay" T.112A	4 cu ft Area not stated	32½×21½×25½	Interior light, plastic interior, flavour pro- tection (automatic de- froosting K.190 only)	White stoved enamel	£53 5 3	£9 14 9
	"Beekay" T.120	4.5 cu ft Area not stated	32½×21½×25½			£59 9 6	£10 17 6
	"Beekay" T.140	5 cu ft Area not stated	34½×23×27			£64 16 0	£11 17 0
	"Beekay" K.150	5.5 cu ft Area not stated	41×22½×27½			£70 2 7	£12 16 5
	"Beekay" K.190	7 cu ft Area not stated	45×24×25½			£87 17 8	£16 1 1

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
BENDIX HOME APPLIANCES, LTD., Albion Works, Kingsbury Road, Birmingham, 24.	301	4 cu ft 8½ sq ft	36×22×25	Interior light, removable table top in grey, yellow or green	White or cream, champagne or coral plastic interior	£50 16 5	£8 18 7
	401	4.5 cu ft 9 sq ft	43×20×20	Interior light, "Alu-froid" light alloy inner lining, non-slam door latch, full-width freezer (cheese tray with special moistener, 683 and 983 only)	White or cream stoved enamel	£61 12 0	£10 18 0
	593	6 cu ft 10 sq ft	42×23×26			£67 14 8	£12 0 4
	683	7 cu ft 12 sq ft	48×23×26			£84 15 11	£14 19 1
	983	10 cu ft 15 sq ft	57×26×30			£106 2 10	£18 17 2
BOSCH, LTD., 20, Carlisle Road, The Hyde, Hendon, N.W.9.	155 WG	5.5 cu ft Area not stated	33×39×19	Wall mounting, two doors	White	£74 12 0	£13 12 0
	110 E	3.9 cu ft 6.5 sq ft	34½×21½×25½	For building-in	White	£55 2 7	£9 19 5
	112 TL	4 cu ft 6.5 sq ft	34½×21½×25½	Interior light, blue heat-proof table top, R. or L.H. doors	White	£56 0 4	£10 2 8
	140 TL	5 cu ft 8.6 sq ft	34½×22½×27½			£60 8 8	£10 19 4
	140 TG	5 cu ft 8.6 sq ft	34½×22½×27½			£64 17 1	£11 15 11
	140 S	5 cu ft 9.6 sq ft	44½×22×28	Interior light, S=box type freezer. SG=full-width deep freezer	White	£63 19 5	£11 12 7
	140 SG	5 cu ft 8.3 sq ft	44½×22×28			£70 3 2	£12 15 10
	180 S	6.4 cu ft 12.9 sq ft	48½×24½×28			£78 2 4	£14 5 8
	180 SG	6.4 cu ft 11.8 sq ft	48½×24½×28			£83 8 5	£15 5 7
	240 SG	8.5 cu ft 14.8 sq ft	55½×26½×28			£99 6 8	£18 5 4
BYLOCK ELECTRIC, LTD., South Street, Enfield, Middlesex.	"Centurion" 13T	4.6 cu ft 5.1 sq ft	33½×24×22½	Interior light, table top, storage for large bottles. Door opens within own width	White	£58 11 9	£10 14 3
J. & D. CLAYTON (IMPORTS) LTD., 128, High Street, Edgware, Middlesex.	"Yuman" 135	4.7 cu ft Area not stated	36×22½×24	Interior light, push-button de-frosting, plastic table top in various colours, roller mounted	White stoved enamel	£64 2 3	£11 14 5
	"Yuman" 155	5.3 cu ft Area not stated	50×22×21	Interior light, push-button de-frosting, lockable doors, roller mounted, porcelain enamel interior		£70 2 3	£12 16 4
	"Yuman" 170	6.2 cu ft Area not stated	50×22×23			£79 2 3	£14 9 3
	"Yuman" 230	8.2 cu ft Area not stated	56×26×36			£100 2 3	£18 6 0
DENHAM & MORLEY, LTD., 173-5, Cleveland Street, London, W.1.	"Denmore" 45	4.5 cu ft 6.5 sq ft	34×21½×26	Interior light, Formica working top	White stoved enamel	£52 16 4	£9 13 2
EASICLENE PORCELAIN ENAMEL (1938), LTD., Lord Street, Wolverhampton, Staffs.	Easiclene "Two-Five"	2.5 cu ft 4.8 sq ft	28½×20½×20½	Wall mounted or free-standing. Plastic interior and door shelves	White or cream, blue interior	£40 11 7 plus £3 3 0 (legs and table top)	£7 8 5
	Easiclene "Four-two"	4.2 cu ft 7.8 sq ft	36×24×26	Interior light, plastic interior and door shelves, mounted on rollers	White or cream, blue interior	£59 3 7	£10 16 5
	Easiclene "Five-Five"	5.5 cu ft 11.2 sq ft	36×24×25½	As above plus egg-rack	White or cream, blue interior	£65 18 11	£12 1 1
EDMUNDSONS SUPPLY CORPORATION, LTD., 240-250, Ferndale Road, London, S.W.9	"Frimatic" 100	3.5 cu ft 6.5 sq ft	33½×20½×21½	Interior light, "Double-cold" refrigeration system, shelves of unbreakable "No-oxyd" material, single piece polystyrene pink or white interior	Coral, green, ivory, yellow, white or black	£53 5 3	£9 14 9
	"Frimatic" 110	4 cu ft 6.5 sq ft	33½×20½×23½			£55 18 4	£10 4 8
	"Frimatic" 120	4.25 cu ft 7.5 sq ft	43½×20×21½			£59 9 3	£10 17 9
	"Frimatic" 140	5 cu ft 7.5 sq ft	44½×21½×22½			£61 5 0	£11 4 0



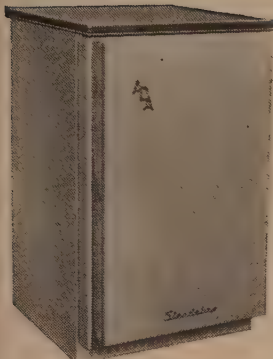
1



2



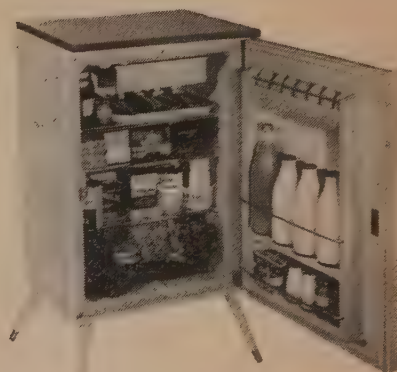
3



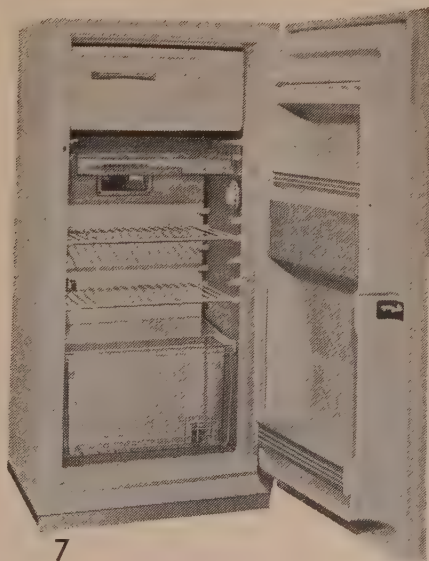
4



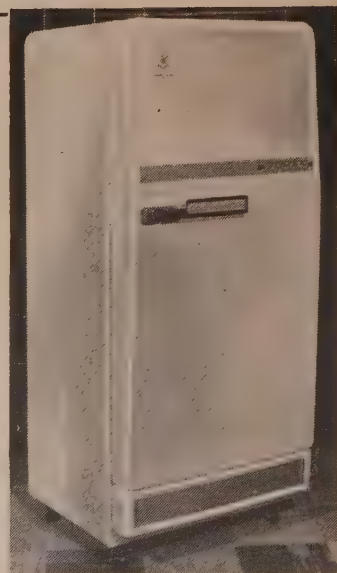
5



6



7



8

1. Bylock "Centurion" model 13T 4-6 cu ft refrigerator
2. Bauknecht "Beekay" model T.140 5 cu ft refrigerator
3. Denham & Morley "Denmore" 45 4-5 cu ft refrigerator
4. Ada "Slendaline" 4-5 cu ft refrigerator
5. A.E.I.-Hotpoint "Iced Diamond" 3-7 cu ft refrigerator
6. Easiclone "Two-Five" 2-5 cu ft refrigerator
7. Bendix model 401 4-5 cu ft refrigerator
8. J. & D. Clayton "Yuman" 8-2 cu ft refrigerator

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
EDMUNDSONS SUPPLY CORPORATION, LTD., 240-250, Ferndale Road, London, S.W.9. (continued)	"Frimatic" 150	5.25 cu ft 10 sq ft	48½ × 22 × 22	Interior light, "Double-cold" refrigeration system, shelves of unbreakable "No-oxyl" material, single piece polystyrene pink or white interior	Coral, green, ivory, yellow, white or black	£66 11 4	£12 3 8
	"Frimatic" 162	5.75 cu ft 10 sq ft	48½ × 22 × 23½			£70 2 6	£12 16 6
	"Frimatic" 190	6.75 cu ft 10.5 sq ft	50 × 23 × 24			£82 11 0	£15 2 0
	"Frimatic" 200	7 cu ft 10.5 sq ft	51½ × 23½ × 25			£82 11 0	£15 2 0
	"Frimatic" 260	9.25 cu ft 15.5 sq ft	57½ × 25½ × 26			£103 17 3	£18 19 9
	"Frimatic" 260D	9.25 cu ft 15.5 sq ft	56 × 27 × 26			£106 10 6	£19 9 6
ELECTRO APPLIANCES & EQUIPMENT, LTD., 177, Regent Street, London, W.1.	"Sigma" S.130	4.8 cu ft 8.5 sq ft	45½ × 23½ × 24½	Interior light, de-frosts without removal of contents, door lock	White or cream	£51 19 5	£9 19 7
	"Sigma" T.15	4 cu ft 8 sq ft	32½ × 22½ × 26			£55 16 3	£10 6 9
	"Sigma" T.L.40	5 cu ft 9.8 sq ft	33½ × 23½ × 23½			£61 2 9	£11 6 3
	"Sigma" S.165	6 cu ft 10.75 sq ft	46½ × 23½ × 25			£71 15 10	£13 5 2
ENGLISH ELECTRIC CO., LTD., East Lancashire Road, Liverpool, 10.	"Slimline Junior" 7505	2.7 cu ft 6 sq ft	32 × 19 × 20	Magnetic door seal, full-width freezer	White, lilac and clover interior	£42 12 2	£7 15 10
	"Slimline Popular" 7504	4 cu ft 6.8 sq ft	37 × 20 × 23	Table-top working surface	White or cream, lilac and clover interior	£53 7 9	£9 15 3
	"Slimline Senior" 7103	7.7 cu ft 11.8 sq ft	46½ × 24 × 27½	Interior light, push-button de-frosting, full-width freezer	White, lilac and clover interior	£92 3 0	£16 17 0
	"Slimline Elite" 7104	9.4 cu ft 13.1 sq ft	54 × 24 × 27½			£105 13 7	£19 6 5
ENGLISH ROSE KITCHENS, LTD., Wharf Street, Warwick.	"Double-Six"	6 cu ft 11½ sq ft	66 × 30 × 24	Vertical sliding door. Additional 6 cu ft storage space	White or cream, or blue, pink, green or grey with white door face	£110 0 0	£20 15 7
FRIGIDAIRE DIVISION OF GENERAL MOTORS, LTD., Stag Lane, Kingsbury, N.W.9	MA-34T	3.4 cu ft 7.7 sq ft	36 × 21 × 21	Plastic interior and door shelves, L. or R.H. door opening large freezer	White, cream, green, pink or red	£49 2 8	£8 12 4
	MA-45T	4.5 cu ft 8.6 sq ft	36 × 24½ × 24½	As above	Cream or white	£58 0 2	£10 4 10
	DA-46T	4.6 cu ft 9.9 sq ft	36 × 24½ × 24½	As above plus interior light	White, cream, green, pink or red	£64 4 5	£11 7 7
	MZ-84	8.3 cu ft 15.8 sq ft	54½ × 27½ × 27½	Interior light, frozen food compartment, 12-position cold control, porcelain on steel interiors	White, cream, green, pink or red. White and cool blue interiors	£100 18 7	£17 14 5
	DZ-84	8.4 cu ft 16 sq ft	54½ × 27½ × 27½			£111 11 7	£19 13 5
	MZ-101	9.9 cu ft 18.7 sq ft	62½ × 27½ × 27½			£129 6 8	£22 18 4
	DZ-101	10.1 cu ft 18.3 sq ft	62½ × 27½ × 27½			£140 17 6	£25 0 6
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2.	"Fabulous Four" DE.42A	4.1 cu ft 7.3 sq ft	36 × 23 × 25½	Interior light, "Turnaround" shelf, "Slidomatic" hinge	Gleaming white or honeysuckle, choice of colours for handle insets	£61 17 4	£10 18 11
	DE.61	6.1 cu ft 12.5 sq ft	51 × 25½ × 26½	Interior light, bottle and egg racks, cheese and butter compartments in door panel		£84 1 8	£14 18 4
	DE.82	8.1 cu ft 15.7 sq ft	55½ × 28 × 28½			£106 2 11	£18 17 1
GENERAL REFRIGERATION, LTD., 39, Beak Street, London, W.1.	"General" C.170L	5 cu ft 6.5 sq ft	47 × 21 × 22	Interior light, semi-automatic de-frosting device, adjustable feet	White stoved enamel	£66 13 0	£12 2 0
	"General" B.180N	6.5 cu ft 7.5 sq ft	49½ × 21½ × 23½			£83 15 0	£16 0 0
	"General" B.180LP	7 cu ft 9.6 sq ft	51½ × 22½ × 22½			£86 8 0	£16 10 0
	"General" 250 LP	9 cu ft 11 sq ft	56 × 24 × 25½			£106 0 0	£20 0 0
GRAFTON ELECTRICAL & MUSICAL INDUSTRIES, LTD., 18, Clifton Street, London, E.C.2.	"Zanussi" 135/TS	4.75 cu ft 7.5 sq ft	34 × 21½ × 21½	Interior light, plastic interior	White	£52 13 0	£9 6 0



9

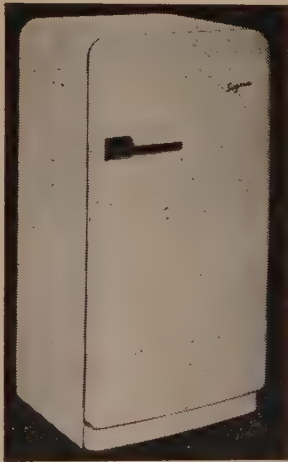


10



11

- 9. G.E.C. model DE.61 6.1 cu ft refrigerator
- 10. English Rose "Double-Six" refrigerator with vertical sliding door
- 11. English Electric "Slimline Senior" model 7103 7.7 cu ft refrigerator
- 12. Electro Appliances & Equipment "Sigma" model S.165 6 cu ft refrigerator
- 13. Frigidaire model MA-34T 3.4 cu ft refrigerator



12



13

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
GRAMOPHONE CO., LTD., Hayes, Middlesex.	DR.39	3.9 cu ft 9.7 sq ft	36×21×24	Interior light, frozen food chest, vegetable container, heat proof table top	White. Plastic and enamelled interiors	£53 5 3	£9 14 9
	DR.48	4.8 cu ft 9.7 sq ft	36×22×27			£60 7 3	£11 0 9
	DR.50	5 cu ft 9.7 sq ft	42½×27½×27½			£66 11 7	£12 3 5
HAMILTON HOUSE ELECTRICS, LTD., 544, Commercial Road, London, E.I.	Siltal "Petit"	4.5 cu ft Area not stated	35×22×24½	Interior light, adjustable feet, table top	White stoved enamel	£59 11 10	£10 15 2
	Siltal "Olympic" 16	6 cu ft Area not stated	48½×22×26	Interior light, adjustable feet, automatic defrosting	Range of five colours	£77 7 8	£13 19 4
	Siltal "Olympic" 24	8.5 cu ft Area not stated	54½×25×28½			£99 12 8	£17 19 4
	Siltal "Crystal" 16	6 cu ft Area not stated	48½×22½×28½			£86 5 7	£15 11 5
	Siltal "Crystal" 24	8.5 cu ft Area not stated	54½×25×30½			£108 10 3	£19 11 9
	Siltal "Crystal" 40	13.5 cu ft Area not stated	61×28×33			£197 9 3	£35 12 9

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
HAMPDEN CO. (MERCHANTS), LTD., 93, Regent Street, London, W.1.	"Polaris"	4.8 cu ft 7.5 sq ft	31½ × 39½ × 17	Wall mounted, magnetic door seal, large freezer	White stoved enamel, blue plastic interior	£75 19 2	£13 15 10
INDES REFRIGERATORS, LTD., 292, Streatham High Road, London, S.W.16.	120 L	4.2 cu ft 7.5 sq ft	36 × 22½ × 21½	Interior light, mounted on castors (automatic de-frost—225 L only)	White or cream	£54 0 0	£9 15 0
	150 L	5 cu ft 9 sq ft	46½ × 22½ × 22½			£63 8 8	£11 10 4
	225 L	8 cu ft 12 sq ft	52½ × 25 × 25½			£79 3 8	£14 5 8
KELVINATOR, LTD., Great West Road, London, W.4.	K.46 MT	4.6 cu ft 7.75 sq ft	35 × 22½ × 25½	Interior light, moisture-seal crisper, extra-low temperature frozen food chest (not K.46 MT), press-button de-frosting (K.94 M), automatic de-frosting (K.94 MD)	White or champagne ivory stoved enamel	£59 17 3	£10 9 9
	K.60 M	6 cu ft 10.3 sq ft	41½ × 22½ × 25½			£71 8 3	£12 11 11
	K.77 M	7.7 cu ft 11.78 sq ft	46½ × 24 × 27½			£91 12 4	£16 7 8
	K.94 M	9.4 cu ft 13.15 sq ft	54 × 24 × 27½			£106 6 0	£18 14 0
	K.94 MD	9.4 cu ft 13.15 sq ft	54 × 24 × 27½	Interior light, automatic de-frosting, food freezer separately insulated	White (special colours to order)	£114 15 1	£20 4 11
	K.77 J-13	13.2 cu ft 18 sq ft	65 × 31 × 25½			£217 7 3	£38 12 9
	KVJ-10	10 cu ft 11.5 sq ft	55½ × 24 × 28½	Interior light, holds 350 lb frozen food	White	£139 5 5	£24 14 7
	"Foodarama"	18 cu ft	63 × 41 × 25	Interior light, automatic de-frosting, separate freezer holds 207 lb frozen food	White (special colours to order)	£373 15 1	£67 0 10
KENWOOD MFG. (WOKING), LTD., Old Woking, Surrey.	"Kenwood Norge" KW.410	4.1 cu ft 7.2 sq ft	36 × 22 × 22½	Interior light, lift-up shelf, plastic interior	White stoved enamel	£55 6 11	£9 15 1
	"Kenwood Norge" KW.560	5.6 cu ft 9.7 sq ft	45½ × 23 × 22½			£64 6 0	£11 6 0
	"Kenwood Norge" KF.12	12 cu ft 17.2 sq ft	61½ × 28 × 27½	Interior light, automatic de-frosting, vit. enamel interior		£162 9 10	£28 12 2
	"Kenwood Norge" KF.13	13 cu ft 19.6 sq ft	64½ × 31 × 28			£210 17 10	£36 18 2
KINGSGROVE, LTD., 101-109, Ladbroke Grove, London, W.11.	"Arctic" 45	4.3 cu ft Area not stated	37 × 20 × 21	Interior light, plastic work top	White lacquered	£52 16 4	£9 13 2
	"Arctic" 50	4.8 cu ft Area not stated	35 × 23 × 25			£61 5 0	£11 4 0
	"Arctic" 60	5.9 cu ft Area not stated	48 × 23½ × 21½	Interior light, console model		£70 2 6	£12 16 6
	"Arctic" 80	7.7 cu ft Area not stated	52½ × 25½ × 23			£85 4 5	£15 11 7
LAYFORD (ELECTRICAL), LTD., 7, Chesterfield Gardens, Curzon Street, London, W.1.	"Brandt" H.110	4 cu ft 7½ sq ft	40 × 18½ × 19½	Interior light, adjustable feet, door opens within its own width	White stoved enamel	£59 14 9	£13 5 3
	"Brandt" H.140	5 cu ft 10 sq ft	45 × 20½ × 21½			£54 15 0	£14 11 0
	"Arthur Martin" 21-10	3.5 cu ft Area not stated	32 × 24 × 24	Interior light, vitreous enamel top and door		£56 11 10	£10 12 2
	"Arthur Martin" 21-50	5.3 cu ft Area not stated	45 × 22 × 23			£64 0 11	£12 12 1
	"Arthur Martin" 21-90	6.75 cu ft Area not stated	53 × 24 × 24	Interior light, frozen food chest, salad crisper, door racks and shelves		£70 14 9	£13 5 3
	"Arthur Martin" 22-50	9 cu ft Area not stated	60 × 24 × 24			£93 6 8	£17 10 0
LEC REFRIGERATION, LTD., Bognor Regis, Sussex.	"Coronet" P.20	2 cu ft 3.6 sq ft	27½ × 21½ × 20½	Pastel coloured door liner and interior, adjustable shelves	White or cream stoved enamel	£34 15 3	£6 3 9
	"Colonial" P.40	4 cu ft 6.7 sq ft	40½ × 23½ × 20½			£44 2 5	£7 17 1



18

19

- 14. Kenwood "Norge" model KF.12 12 cu ft refrigerator
- 15. "Polaris" 4.8 cu ft wall mounting refrigerator (Hampden Co. (Merchants), Ltd.)
- 16. Indes model 150L 5 cu ft refrigerator
- 17. Layford "Arthur Martin" model 21-50 5.3 cu ft refrigerator
- 18. Lec Refrigeration model P.20 "Coronet" 3.6 cu ft refrigerator
- 19. Kingsgrove "Arctic" 4.5 cu ft refrigerator
- 20. Kelvinator range: left to right, models K.77M, K.94M, K.94MD, K.77J-13, KVJ-10, K.60M and K.46MT

20



Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
LEC REFRIGERATION, LTD., Bognor Regis, Sussex. (continued)	"International" P.60	6 cu ft 10.7 sq ft	44×23½×25½	Interior light, full-width "Dewbin." Plastic interior (P.60). Aluminium interior (P.8 G)	White or cream stoved enamel	£61 6 8	£11 2 4
	"Continental" P.8 G	8 cu ft 14.5 sq ft	57½×26½×27½			£87 19 9	£15 19 3
	Home Freezer CF.25	5.4 cu ft	41×38½×23½	Automatic alarm and locking handles available	White stoved enamel	£89 0 0	£16 1 2
LEE PRODUCTS (G.B.), LTD., Elpico House, Longford Street, London, N.W.1.	Frigeavia "Djinn" 95	3.4 cu ft 4 sq ft	40½×19½×20½	Interior light, lockable doors	White stoved enamel	£52 15 9	£9 3 3
	Frigeavia "Trident" 150	5.3 cu ft 5 sq ft	47½×22½×26½			£64 8 7	£11 3 5
	Frigeavia "Espadon" 200	7.1 cu ft 8 sq ft	48½×24×28			£83 2 9	£14 10 3
	Frigeavia "Caravelle" 240	8.5 cu ft 10 sq ft	55½×25×29½			£98 6 0	£17 4 0
LIGHTFOOT REFRIGERATION CO., LTD., Abbeyle Road, North Circular Road, Wembley.	LT.13.5	4.7 cu ft 9.7 sq ft	36×22×27	Interior light, plastic table top, frozen food compartment in door	White stoved enamel	£57 10 3	£10 9 9
	LH.14	4.9 cu ft 9.7 sq ft	42½×23½×27½	Interior light, in-door shelves and racks		£67 0 0	£12 5 7
	LH.18	6.4 cu ft 12.1 sq ft	45½×23½×28½			£80 10 0	£14 14 9
	LH.26	9.2 cu ft 17.8 sq ft	54½×28×29½			£117 0 0	£21 6 11
LONOR, LTD., 1, Maddox Street, London, W.1.	"Siemens" T.3/110 T	4 cu ft 6.8 sq ft	33½×21×26	Interior light, lockable door, pale green interior	White stoved enamel	£56 0 7	£10 2 5
	"Siemens" T.3/140	5 cu ft 10.2 sq ft	42×22×26½			£67 11 10	£12 4 2
	"Siemens" T.3/260	9.3 cu ft 17.8 sq ft	54½×28×24			£112 19 0	£20 8 0
MERSEYSIDE ENGINEERING (REFRIGERATION), LTD., Corinthian Buildings, South Castle Street, Liverpool, 1.	"Everest" 375	3.75 cu ft 7.3 sq ft	36×22×22	Interior light, heat-resistant table top (4 sq ft working top—535)	White or cream stoved enamel	£51 9 10	£9 8 2
	"Everest" 400	4 cu ft 7 sq ft	33½×22½×24½			£55 18 6	£10 4 6
	"Everest" 435	4.35 cu ft 7.7 sq ft	36×22×24½			£58 11 9	£10 14 3
	"Everest" 535	5.35 cu ft 9 sq ft	36×24×24	Interior light, 4-zone temperature principle		£66 11 7	£12 3 5
	"Everest" 615	6.1 cu ft 10.1 sq ft	45½×22½×22½			£79 0 4	£14 8 8
	"Everest" B.180 N	6.5 cu ft 11.3 sq ft	50½×22×25½			£86 11 0	£15 6 6
	"Everest" B.180 LP	7 cu ft 13.9 sq ft	50½×22½×25			£88 15 5	£16 4 7
NORSKA REFRIGERATORS, Albion House, Queen Street, Oldham, Lancs.	"Silo" 115 TK	4 cu ft 6.7 sq ft	33×22½×28	Interior light, plastic interior	White stoved enamel	£43 19 6	£7 9 6
PRESTCOLD DIVISION, PRESSED STEEL CO., LTD., Cowley, Oxford.	"Packaway" D. or DW. 301	3.1 cu ft 5.2 sq ft	33½×20½×18½	Can be mounted on wall	White or cream. Blue and white interior	£49 8 10	£8 13 6
	"New Big Four" D.432	4.3 cu ft 8.3 sq ft	37½×22½×24½	Interior light, table top in choice of 5 colours, concealed wheels		£60 0 4	£10 12 2
	"Luxury Six" D.671	6.7 cu ft 11.7 sq ft	47½×25½×25½	Interior light, extra-roomy door shelves		£84 18 6	£14 19 6
	"Automatic Nine" T.901	9 cu ft 12½ sq ft	56½×27½×27	Interior light, automatic de-frosting system, deep freezer		£122 19 11	£21 15 1
SIMPLEX ELECTRIC CO., LTD., Creda Works, Blythe Bridge, Staffs.	"Creda" 300	3 cu ft 5.6 sq ft	33×19½×20½	Recessed door handle, door open within own width, large door panel store, heat-proof table top (interior light 475 only)	White or cream stoved enamel. Coffee-coloured plastic interior	£45 19 6	£8 12 6
	"Creda" 475	4.75 cu ft 8.5 sq ft	36×23½×22½			£58 7 2	£10 18 10
SPECIAL ELECTRICAL APPLIANCES (1959), LTD., 108, Leigh Walk, Edinburgh, 6.	"Atlas" K.137	4.8 cu ft Area not stated	42½×23×23½	Interior light, plastic covered table top	White stoved enamel	£69 5 4	£12 10 0



21



22



23

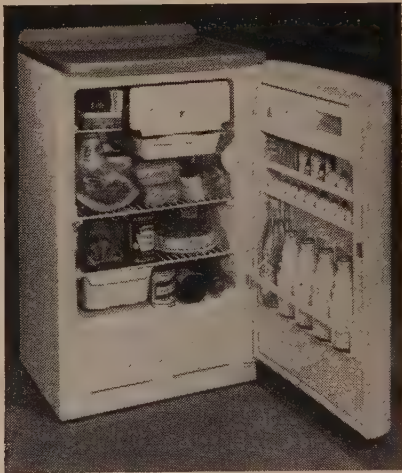
- 21. Merseyside Engineering model B.180N 6.5 cu ft "Everest" refrigerator
- 22. Norska "Silo" model 1153K 4 cu ft refrigerator
- 23. "Siemens A.G." model T3/140 5 cu ft refrigerator (Lonor, Ltd.)
- 24. Simplex "Creda 300" 3 cu ft refrigerator
- 25. Special Electrical Appliances "Atlas" BA.77 2.7 cu ft refrigerator
- 26. Prestcold "New Big Four" model D.432 4.3 cu ft refrigerator



24



25

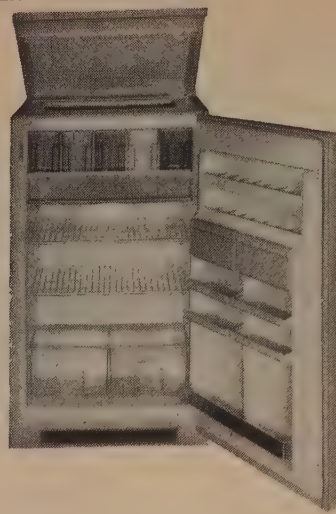


26

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
TEDELEX (LONDON), LTD., Valric House, 2-4, Great Eastern Street, London, E.C.2.	"Tedelex" 441 TT	4.4 cu ft 8.5 sq ft	36×22×22	Interior light, transparent plastic crisper box (Formica working top on table top models)	White stoved enamel	£56 16 3	£10 7 9
	"Tedelex" 3125	4.4 cu ft Area not stated	43½×22½×24½			£61 13 11	£11 5 7
	"Tedelex" 3150 TT	5.3 cu ft Area not stated	35½×22½×27½			£70 11 5	£12 18 1
	"Tedelex" 3155	5.5 cu ft Area not stated	45×22½×25½			£70 11 5	£12 18 1
	"Tedelex" 3165 A	5.8 cu ft Area not stated	49½×22½×25½			£82 11 2	£15 1 10
	"Tedelex" 3185 A	6.7 cu ft Area not stated	50½×23½×25½			£90 10 11	£16 11 1



27



28

27. Tricity Cookers "Four-Point-Two" 4.2 cu ft refrigerator

28. AEG "Frigomat" 6 cu ft refrigerator (Welmec Corporation)

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
TEDELEX (LONDON), LTD., Valric House, 2-4, Great Eastern Street, London, E.C.2. (continued)	"Tedelex" 3205 A	7.6 cu ft Area not stated	52½ × 24½ × 25½	Interior light, transparent plastic crisper box (Formica working top on table top models)	White stoved enamel	£102 1 9	£18 13 3
	"Tedelex" 3235 A	8.5 cu ft Area not stated	56 × 24½ × 27			£110 19 3	£20 5 9
TRICITY COOKERS, LTD., Thorn House, Upper St. Martins Lane, London, W.C.2.	"Four-Point-Two"	4.2 cu ft 9.1 sq ft	36 × 21½ × 24	Interior light, rubber wheels, vit. enamel table top	White "Epikote" enamel	£55 18 6	£10 4 6
WELMEC CORPORATION, LTD., 147-8, Strand, London, W.C.2.	AEG 120	4.25 cu ft 8 sq ft	33½ × 20½ × 22½	Interior light, magnetic door lock, full-length handle (automatic defrost and 1 cu ft deep-freeze compartment, 200 S only)	White, multi-coloured plastic door racks and interiors	£55 12 10	£10 10 2
	AEG 150	5.25 cu ft 9.1 sq ft	33½ × 21½ × 23½			£60 18 9	£11 10 3
	AEG 190	6.75 cu ft 12.9 sq ft	44½ × 22½ × 25			£78 12 0	£14 17 0
	AEG "Frigomat" 200 S	7 cu ft 12 sq ft	43 × 25 × 25			£113 18 7	£21 10 5

ABSORPTION

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
COLDETTE REFRIGERATION, 11, Dafforne Road, London, S.W.17.	"Cadet"	3 cu ft 5.5 sq ft	35 × 21 × 23	Suitable for dining room or lounge	Oak, mahogany or walnut	£49 0 0	£8 13 0
COMMERCIAL MANAGERMENTS, LTD., 90-94, Archway Road, London, N.19	"Mini-Rex" Standard	1 cu ft 3 sq ft	20 × 16 × 17	Adaptable to 100/110, or 200/250 V or 6. 12 or 24 V battery, stand £2 extra	White polystyrene	£23 13 7	£4 2 11
	"Mini-Rex" De-luxe	1.25 cu ft 4 sq ft	20 × 16 × 17			£25 8 11	£4 9 7
DENHAM & MORLEY, LTD., 173-5, Cleveland Street, London, W.1.	"Denmore" 15	1.5 cu ft 3 sq ft	20 × 20 × 22	Wall mounting or free standing	White stoved enamel	£30 12 6	£5 12 0
	"Denmore" 25	2.5 cu ft 4 sq ft	30½ × 21½ × 24	Interior light, Formica working top		£42 3 4	£7 14 2
EDMUNDSONS SUPPLY CORPORATION, LTD., 240-250, Ferndale Road, London, S.W.9.	"Sivia" 31	1.25 cu ft 2 sq ft	18 × 16½ × 20½	Plastic interior, suitable for 12, 24, 110 or 240 V (lift-top lid—31 only)	White polystyrene	£25 14 10	£4 14 2
	"Sivia" 42	1.5 cu ft 2.5 sq ft	22 × 19½ × 21½		White stoved enamel	£28 8 2	£5 3 10



29



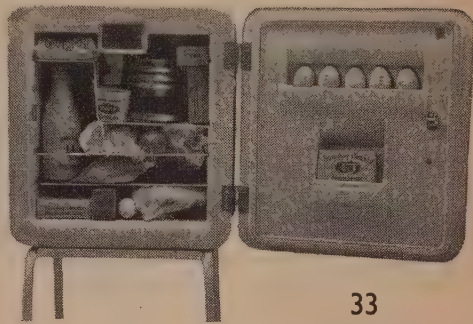
30



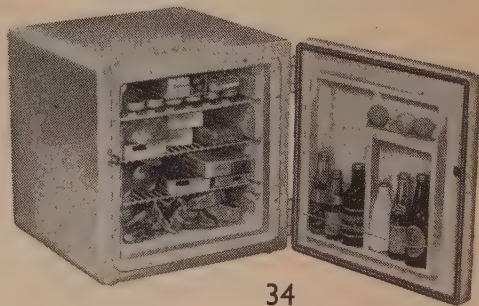
31



32



33



34

29. Pakamac "Pakamatic" 4 cu ft refrigerator
30. Electrolux model L.50 5 cu ft refrigerator
31. Coldette Refrigeration "Cadet" 3 cu ft refrigerator
32. G.E.C. model DE.250 2-6 cu ft refrigerator
33. Commercial Managements "Mini-Rex" de-luxe 1-25 cu ft refrigerator
34. Denham & Morley "Denmore" 15 1-5 cu ft refrigerator

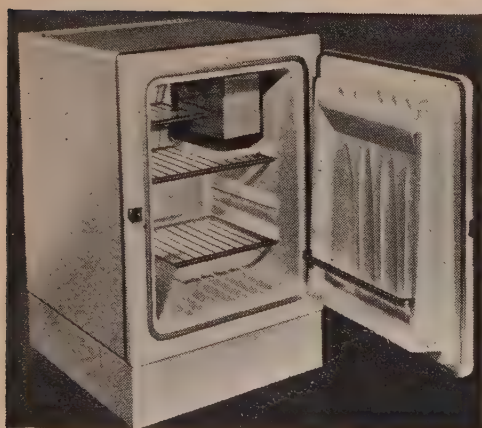
Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
ELECTROLUX, LTD., 153-5, Regent Street, London, W.1.	L.26	2.5 cu ft 5.5 sq ft	32½ × 21 × 25	Traytop available as extra, flexible ice-cube release	White or cream stoved enamel	£40 9 5	£7 8 0
	L.37	3.7 cu ft 7.25 sq ft	36½ × 21½ × 24½			£51 16 4	£9 9 5
	L.50	5 cu ft 10 sq ft	53½ × 26½ × 27½	Interior light four covered containers and vegetable drawer		£81 14 9	£14 18 10
	L.76	7.6 cu ft 14.25 sq ft	58½ × 30½ × 28½			£106 11 0	£19 9 7
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway London, W.C.2.	DE.250	2.6 cu ft 5.5 sq ft	32½ × 21½ × 24½	Plastic interior removable racks	Gleaming white or honeysuckle	£40 18 0	£7 9 6
HAMILTON HOUSE ELECTRICS, LTD., 544, Commercial Road, London, E.1.	" Silent Princess "	3.5 cu ft Area not stated	36 × 22 × 23	Interior light, table top	White stoved enamel	£49 4 10	£8 10 2

Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
JOHN HARPER & CO., LTD., Albion Works, Willenhall, Staffs.	"Harper"	2.5 cu ft 4 sq ft	28×22×24½	Plastic interior, suitable for wall mounting or free standing	White stoved enamel	£40 7 10	£7 7 8
JOHN E. HARRISON, LTD., 71-79, Candleriggs, Glasgow, C.I.	"Harrison" 22	2.1 cu ft 4.1 sq ft	26×20½×22½	Ice-blue plastic interior	White stoved enamel	£37 19 6	£6 17 1
HELMATIC, LTD., 22-24, Buckingham Palace Road, London, S.W.1.	"King Cold" 18520-22	1.8 cu ft 4 sq ft	26½×21½×21½	Built-in type, several containers in door. Coloured plastic interior	White plastic door	£43 18 3	£7 16 5
	"King Cold" 18554-56	3 cu ft 4.2 sq ft	34½×21½×23½			£48 14 2	£8 13 11
	"King Cold" 18566-68	3 cu ft 4.2 sq ft	34½×21½×23½			£52 4 3	£9 6 6
	"King Cold" 18604-06	4.3 cu ft 7.6 sq ft	42½×21½×23½			£63 17 3	£11 8 2
KINGSGROVE, LTD., 101-109, Ladbroke Grove, London, W.11.	"Arctic" 25	2.3 cu ft Area not stated	33×21½×24	Interior light, plastic table top	White lacquered	£42 3 4	£7 14 2
F. & T. LEAT, LTD., Ebbwens Road, Hemel Hempstead, Herts.	"Leatline" 3-6	3.6 cu ft 7.5 sq ft	36×21×21	Interior light, vit. enamel table top, adjustable feet	White stoved enamel	£43 18 11	£7 10 1
LONOR, LTD., 1, Maddox Street, London, W.1.	Frigil "Cleanmaster" 42	1.5 cu ft 3.7 sq ft	25×20×20	Suitable for wall mounting	White stoved enamel	£31 2 7	£5 12 5
	"Siemens" AKT/80	2.8 cu ft 6.3 sq ft	33½×21×23	Interior light, lockable door, plastic interior		£44 0 5	£7 19 1
R. & A. MAIN, LTD., (ELECTRICAL DIVISION), 48, Grosvenor Gardens, London, S.W.1.	"Main 24"	2.4 cu ft 5.4 sq ft	36×21×21	Light blue plastic interior, adjustable shelves	White or cream stoved enamel, red trim	£37 0 7	£6 15 5
MORPHY-RICHARDS (ASTRAL), LTD., 50, Conduit Street, London, W.1.	"Astral Table" A.200 A	2 cu ft 4.2 sq ft	25½×21½×21½	Adjustable shelves, door racks, frozen food accommodation	White or cream stoved enamel	£30 19 6 £1 9 6 (Legs)	£5 15 6
	"Astral Console" B.230 A	2.3 cu ft 4.7 sq ft	36×22×21½			£37 15 0	£7 0 10
	"Astral Commodore" A.400 D	4 cu ft 8 sq ft	41½×22½×24			£46 6 8	£8 12 10
PAKAMAC (SPECIAL PRODUCTS), LTD., Moorside, Oldham, Lancs.	"Pakamac" PK.350	4 cu ft 7.75 sq ft	36½×22×25½	"Melamine" table top, ice-blue plastic interior	White stoved enamel	£46 3 2	£8 8 10

35. Harper 2.5 cu ft refrigerator

36. Morphy-Richards "Astral Commodore" 4 cu ft refrigerator

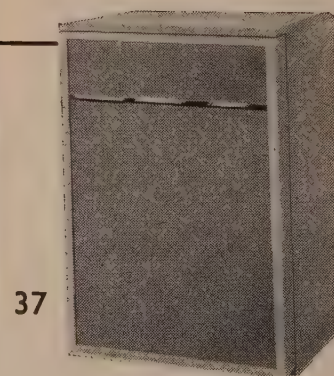
37. F. & T. Leat "Leatline" 3.6 cu ft refrigerator



35



36



37

38. Main "24" 2.4 cu ft refrigerator

39. Radiation "Jackson 202" 2 cu ft refrigerator

38



39



Manufacturer or Distributor	Model	Cubic Capacity and Shelf Area	External Dimensions (H., W. & D. in inches)	Special Features	Finish	Price (excl. tax)	Purchase Tax
RADIATION, LTD., ELECTRICAL DIVISION, 255, North Circular Road, London, N.W.10.	"Jackson" 202	2 cu ft 3.4 sq ft	27½ × 21½ × 21½	One-piece "Astrakon" plastic cabinet	White	£30 18 11 £1 14 11 (Table top) £0 17 6 (Legs) £2 2 0 (Wall mounting kit)	£5 16 1 £0 2 4 — —
SPECIAL ELECTRICAL APPLIANCES (1959), LTD., 108, Leith Walk, Edinburgh, 6.	"Atlas" BA.77	2.7 cu ft Area not stated	33½ × 21½ × 25½	Interior light, plastic covered table top	White stoved enamel	£45 8 4	£8 4 0
TEDELEX (LONDON), LTD., Valric House, Great Eastern Street, London, E.C.2.	"Tedelex" 75 T.T.	2.7 cu ft Area not stated	33½ × 22 × 22½	Interior light, Formica working top	White stoved enamel	£43 10 0	£7 19 0

CATALOGUES AND LISTS

CABLE FITTINGS.—Catalogue (38 pages) covering the company's range of controlled compression type cable glands, sealing boxes and junction boxes in standard and flameproof patterns.—**Hawke Cable Glands, Ltd.,** Ashworth Street, Denton, Manchester.

Leaflet and price list on weatherproof nylon cable glands and plastic insulating bushes.—**Elkay Electrical Manufacturing Co., Ltd.,** 42, Woburn Place, London, W.C.1.

CIRCUIT - BREAKERS.—Catalogue (TLIOP/2) dealing with "Protector" general purpose miniature circuit-breakers and distribution boards.—**Chilton Electric Products, Ltd.,** Hungerford, Berks.

CONDUIT FITTINGS.—Illustrated and priced 40-page catalogue (18) covering the "Blaco" range of conduit fittings, together with leaflets on plaster-depth switch boxes and the "Blacon" all-insulated conduit system.—**F. C. Blackwell & Co., Ltd.,** Musker Street, Liverpool, 23.

CONTROL EQUIPMENT.—Catalogue (R.30/2E) dealing with electric switch and contact automatic controllers and alarm mechanisms, a leaflet dealing with an aircraft fuel flowmeter integrating indicator and a Spanish version of the company's general catalogue.—**Negretti & Zambra, Ltd.,** 122, Regent Street, London, W.1.

Data book (48 pages) covering the company's range of relays and electrical automatic control apparatus.—**Londex, Ltd.,** 207, Anerley Road, London, S.E.20.

Brochure containing details of instruments and controls for research, industry and education.—**Servomex Controls,** Crowborough, Sussex.

DOMESTIC APPLIANCES.—Revised price list of "Swan Brand" electrical appliances and ground base holloware.—**Bulpitt & Sons, Ltd.,** Icknield Street, Birmingham, 18.

ELECTRONIC COMPONENTS.—Illustrated 164-page catalogue and price list covering the company's range of electronic components.—**A. F. Bulgin & Co., Ltd.,** By-Pass Road, Barking, Essex.

INSTRUMENTS.—Illustrated 32-page catalogue (N) on scientific instruments.—**W. G. Pye & Co., Ltd.,** Granta Works, Cambridge.

Catalogue (182) illustrating and describing a range of temperature measuring instruments for power plant, industrial boilers and heating and ventilating installations, etc.—**James Gordon & Co., Ltd.,** Dalston Gardens, Stanmore, Middlesex.

Catalogue of 24 pages giving concise descriptions of telecommunications test gear.—**Marconi Instruments, Ltd.,** St. Albans, Hertfordshire.

Leaflets (121 and 122) dealing with an automatic titrimeter and a precision universal pH meter.—**Doran Instrument Co., Ltd.,** Stroud, Glos.

Brochure (309/1) giving information on gas analysers for hydrogen-cooled alternators.—**Cambridge Instrument Co., Ltd.,** 13, Grosvenor Place, London, S.W.1.

INSULATING MATERIALS.—Illustrated 4-page booklet (E.117) giving details of "Electrofine" asbestos paper and paper tape impregnated with silicone resin, and brochure (E.118) covering natural grade "Sindanyo" for laboratory furniture.—**Turners Asbestos Cement Co., Ltd.,** Trafford Park, Manchester, 17.

LIGHTING FITTINGS.—Catalogue (208 pages) dealing with fluorescent and tungsten lighting fittings, display lighting, exterior lighting equipment and accessories. Prices and, where applicable, purchase tax figures are given and the catalogue includes five pages of general lighting information and seven pages of data relating specifically to fluorescent fittings.—**Edmundsons Electrical Wholesalers, Ltd.,** 240-250, Ferndale Road, London, S.W.9.

Catalogue (134 pages) illustrating and describing the range of fluorescent and tungsten lighting fittings and luminous ceiling systems produced by the company.—**Harris & Sheldon Electrical, Ltd.,** 46, Great Marlborough Street, London, W.1.

Broadsheet dealing with bi-pin fluorescent fittings, polyester-filled ballasts and rotor type lampholders.—**Philips Electrical, Ltd.,** Century House, Shaftesbury Avenue, London, W.C.2.

METAL CABINETS.—Catalogue illustrating and describing sheet steel cases and cubicles for the electrical and electronics industries.—**Willsher & Quick, Ltd.,** Highbridge, Somerset.

RELAYS.—Leaflet describing a photo-electronic general purpose relay to perform control functions by the breaking or variation in intensity of a light beam.—**Photoelectronics (M.O.M.), Ltd.,** Oldfields Trading Estate, Sutton, Surrey.

RESINS AND GLUES.—Catalogue detailing the company's range of synthetic resins and giving information on their applications in the electrical, engineering and other industries.—**Leicester, Lovell & Co., Ltd.,** North Baddesley, Southampton.

NEW BOOKS

Nature and Properties of Engineering Materials. By Zbigniew D. Jastrzebski. Pp. 571; figs. John Wiley & Sons, Inc., New York. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 88s.

In this book the fundamental nature of materials is considered from an engineering viewpoint. It is intended to provide the basic knowledge necessary for the selection of suitable materials for specific engineering applications and also for use as a textbook for courses in engineering materials. For its full understanding, a knowledge of general chemistry and physics and some calculus is required. The opening sections deal generally with materials and cover such subjects as atomic structure and the periodic table, inter-atomic and inter-molecular forces, states of aggregation, colloids and organic high polymers, the basic concepts of phase transformers and such mechanical properties as elasticity, plasticity and radiation damage. Ensuing chapters develop these basic principles in considering specifically the characteristic properties and uses of such engineering materials as metals, both ferrous and non-ferrous, and ceramic and related materials. A 38-page section is devoted to electrical and magnetic properties, and reference is made to conductivity, superconductivity, dielectric properties, insulating materials, semiconductors, hysteresis and the domain theory of magnetisation. Chapters are also included covering thermal properties, corrosion, friction and lubrication and protective materials.—T.R.W.

Economic Control of Interconnected Systems. By Leon K. Kirchmayer. Pp. 207; figs. Chapman & Hall, Ltd. Price 100s.

"This book has as its primary thesis the treatment of computers, controllers, and theoretical methods to obtain the optimum economic operation of interconnected electric utility systems." So says the author in the preface, which later cites a number of the important "tools" employed in the development of optimising computer controllers. Briefly, these are theoretical and differential analyser methods of predicting system performance, mathematical models of processes whose operation is to be optimised, the use of matrix, tensor and diakoptic methods, mathematical methods to determine equations for optimum performance, and integration of computer and controller to obtain a computer control system. These subjects, then, set the pattern for the book.

The ground covered is broad in the sense that the studies embrace individual interconnected systems and interconnected areas of supply. Control features are those associated with power, frequency and voltage and the author gives much practical guidance on such major matters as governor control, power interchange between systems, incremental losses and costs, economic allocation of generation, minimum-cost operation, energy accounting, and on a multiple area despatching computer which handles economic allocation of generation, economic interchange of power, calculation of power flow over tie lines and incremental cost data.

The chapter on the analysis of losses in interconnected systems makes extensive use of matrices as well as intro-

ducing Kron's diakoptics for the piecewise solution of a large two-division system. Elsewhere in the book the conditions are governed by sets of differential and partial differential equations, for which worked numerical examples would have been an asset and, perhaps, would have helped to clarify procedures for the less experienced engineer.

The volume is a companion to the author's previous book published in 1958, "Economic Operation of Power Systems," and together the two present a very thorough account of some of the most modern techniques for assessing power system performance and economics.—A.E.

Electronic Computers and their Business Applications. By A. J. Burton and R. G. Mills. Pp. 325; figs. Ernest Benn, Ltd., Bouverie House, Fleet Street, London, E.C.4. Price 45s.

The three parts of this book, which is intended to explain to senior executives in industry and other businesses what the use of large electronic digital computers involves, deal with equipment, techniques and applications. The first part covers, in simple form, the basic theory and operational method of digital computers, and this is followed by a section on some of the techniques used in their employment. Chapters are included in this part on planning for an equipment and the necessary staff, and on programming. The final section refers to such typical business applications as the control of the payroll, sales accounting and stock control, insurance, the Stock Exchange and banking. Appendices list the companies marketing business computers in Great Britain and give details of ancillary equipment, programme flow chart symbols and automatic coding.—T.R.W.

BOOKS RECEIVED

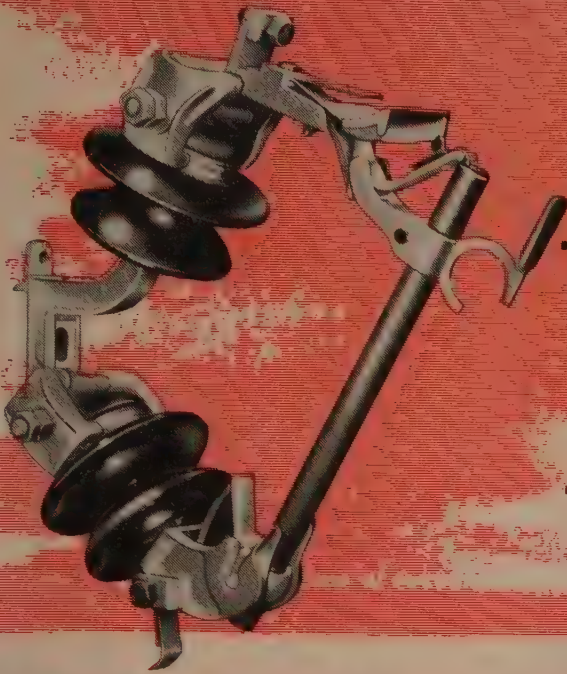
Basic Technical Electricity. 3rd edition. By H. Cotton. Pp. 246; figs. 74. Cleaver-Hume Press, Ltd., 31, Wright's Lane, Kensington, London, W.8. Price 12s 6d.

Practical Residential Wiring. 2nd edition. By John F. Nowak. Pp. 511; figs. D. Van Nostrand Co., Ltd., 358, Kensington High Street, London, W.14. Price 60s.

ELECTRONIC EQUIPMENT RELIABILITY

THE importance of electronic equipment for industrial or military use is now well recognised, and is of increasing interest to electronic equipment designers and engineers, parts designers and manufacturers, industrial and military users of electronic equipment and to inspectors and approving authorities. The environmental conditions which equipments for Services' use must now withstand, and the massive complexity of electronic computers, are two of the factors causing concern on the score of reliability.

The need clearly exists for some means of exchanging information on all aspects of electronic reliability and, as a result, the Institution of Electrical Engineers has arranged a symposium on the subject as an initial step in meeting this need. This will take place in London on Wednesday, 18th May.



J. & P.

TYPE 'D' FUSE-SWITCH

... now up-rated to

150 MVA at 11 kV

OVER 1000 TESTS

prove the reliability of

J. & P. 'D' Fuse-Switches for overhead line protection.

During an extensive research and testing programme involving over 1000 short-circuit tests, J. & P. have again proved the efficiency of the Type 'D' Fuse-Switch and with only minor modifications to the original design have succeeded in up-rating it to 150 MVA at 11 kV. It has been fully certified for this breaking capacity at the G.E.S.I. Laboratories, Milan.

250,000 UNITS

and 25 years' experience lie behind the J. & P. 'D' Fuse-Switch. Few items of electrical equipment have been so thoroughly proved in the field as the 'D' Fuse-Switch which has undergone only minor changes in design since it was first introduced in 1934.

The mark that means that
"little more" in quality



JOHNSON & PHILLIPS LTD.

CHARLTON, LONDON, S.E.7

ELECTRICAL ENGINEERS AND CABLE MAKERS

Overseas Factories in AUSTRALIA, SOUTH AFRICA, PAKISTAN, and INDIA (in association with Balmer, Lawrie & Co. Ltd.)

10 TIMES BETTER OFF WITH CLASS H MOTORS

If the insulation system of one electric motor lasts ten times as long as that of another—it's something you should know about! So here are the plain facts about Class H Motors.

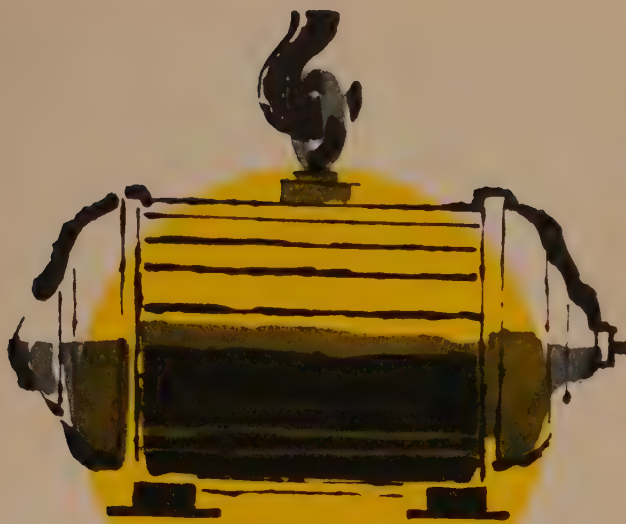
Continuous running tests have proved conclusively that the insulation life of Class H machines outlasts that of Class A or B motors by more than ten times. Although silicone-insulated motors cost more initially, the extra outlay is repaid time and time again in terms of lower replacement costs, lower maintenance costs and lower production losses due to breakdown.

No matter how testing the working conditions, Class H Motors will take the strain. High humidity levels . . . high working temperatures . . . heavy overloads. All these 'occupational hazards' the Class H Motor can take in its stride since MS silicone insulation reduces the risk of breakdown to the very minimum. And because these motors are so resistant to overload, it's often possible to choose a machine of lower capacity than if a Class A or B machine were being used. Result—still further economies.

So don't imagine that the Class H Motor is in the 'luxury' class . . . something to be specified only in exceptional conditions. On the contrary, a silicone-insulated motor is today's first choice—no matter what the circumstances!

MS





REMEMBER SILICONES FOR REWINDS TOO

The value of silicone insulation is by no means restricted to new machines. Many a troublesome Class A or B motor—given to repeated breakdowns—has been totally transformed by a timely silicone rewind.

At the Latchford Locks Works of the British Aluminium Co. Ltd. a centrifuge, used for cleaning aluminium swarf, is powered by a 15 HP motor which is mounted beneath the centrifuge. To help in the cleaning, live steam at about 10 psi is admitted to the centrifuge while it is in motion. The motor, when new in 1954, was wound with Class A insulation, but failed after eight months due to condensation on the windings. Rewound with Class A it failed again—this time after only two weeks' service. To prevent repetition of these failures the motor was then rewound using silicone insulation, and in fact ever since it was recommissioned in May 1955, British Aluminium report, 'the centrifuge has been used almost constantly without further trouble with the motor windings'. They go on to say, 'There is no doubt that the employment of silicone insulation has greatly lengthened the trouble-free working of the winding of this motor.'

Amongst the leading manufacturers of Class H motors are: Associated Electrical Industries (Rugby) Ltd The English Electric Co Ltd · The General Electric Co Ltd · Bruce Peebles & Co Ltd · Woods of Colchester Ltd · Brook Motors Ltd · Lancashire Dynamo & Crypto Co Ltd · Brush Electrical Engineering Co Ltd · Howells Electric Motors Ltd · Laurence, Scott and Electromotors Ltd.

For a list of names of the many rewinders experienced in the use of silicone insulation, contact your nearest Midland Silicones branch office.

All over Britain, MS silicones are strengthening the weak link in electrical equipment—its insulation. Midland Silicones Ltd manufacture a full range of silicone products for use in the electrical industry. And Midland Silicones Ltd consistently set the pace for progress in this fast-developing field.



MIDLAND SILICONES LTD *first in British Silicones*

(Associated with Albright & Wilson Ltd. and Dow Corning Corporation)

68 KNIGHTSBRIDGE · LONDON · SW1 · TELEPHONE: KNIGHTSBRIDGE 7801

Area Sales Offices: Birmingham · Glasgow · Leeds · London · Manchester · Agents in many countries

PRECISION CONTROL



VOLTAGE
CURRENT
POWER
SPEED
TRANSDUCTORS
INVERTERS

GRID-CONTROLLED MERCURY ARC RECTIFIERS
with or without arc suppression

G.E.C.

OF ENGLAND

THE GENERAL ELECTRIC COMPANY LIMITED OF ENGLAND, RECTIFIER AND ELECTRONICS DIVISION, BIRMINGHAM, 6.

OVERSEAS ELECTRICAL TRADE

ELECTRICAL goods worth £19.5 million were exported from the United Kingdom in March. This brought the total for the first quarter of the year to £60.5 million, or 8 per cent more than in the first quarter of 1959. The increase was largely due to exports to the United States, Australia, Argentina, Rhodesia and Nyasaland, and Canada. The slight fall in the value of exports of transformers and switchgear, etc., was almost balanced by increased exports of generators and motors. There was, however, a marked drop in the exports of

generators and motors to European countries. Exports of electronic equipment continued at the level of a year earlier, Canada, Australia, the United States, India and the Netherlands being the principal markets, but there was a slight fall in exports of telegraph and telephone apparatus. A substantial contribution to the increase in total electrical exports was the rise of 38 per cent in exports of electric cables. This was principally the result of large shipments of submarine cable to the United States. Among consumer goods, 63 per cent more wash-

TABLE I.—ELECTRICAL EXPORTS

Class	Month of March 1960	Three months ended March 1960		Class	Month of March 1960	Three months ended March 1960	
	£	£	£		£	£	£
Generating sets and generators:				Cookers	32,595	108,092	114,597
Diesel-driven, up to 10 kW	151,029	318,067	443,297	Toasters	17,451	49,818	42,331
Ditto, 10 to 65 kW	161,723	518,681	507,745	Other cooking apparatus	57,204	97,772	135,614
Ditto, 65 to 200 kW	104,634	469,674	361,378	Parts and accessories	75,945	242,858	275,491
Ditto, over 200 kW	111,193	804,054	378,130	Space heating appliances	26,126	63,533	81,630
Steam turbine driven	87,987	291,651	276,822	Water heating appliances	24,835	90,320	91,081
Spark ignition engine, hydraulic turbine or other prime mover driven	46,385	150,234	70,603	Other heating appliances	24,266	76,194	74,219
Generators, not exceeding 200 kW	71,269	299,493	298,165	Parts and accessories	77,033	213,092	283,768
Ditto, over 200 kW	80,926	288,620	308,342	Irons	73,177	193,017	225,672
Parts of generators	790,418	1,557,741	1,887,409	Arc welding equipment, a.c.	46,161	99,281	151,426
Motors, complete, other than railway, tramway and trolley-bus:				Ditto, d.c.	56,024	173,932	179,352
Up to ½ h.p.	261,920	404,822	692,253	Resistance welding equipment	15,704	43,930	109,672
Over ½ but under 1 h.p.	67,737	140,571	185,680	Electric furnace plant	69,165	284,731	212,611
1 h.p. to 250 h.p.	472,332	1,311,657	1,452,299	Magnetos, ignition	5,225	32,907	22,776
Over 250 h.p.	209,869	496,598	596,091	Spark plug	186,379	412,756	619,032
Railway, tramway and trolley-bus motors complete and parts of all motors	182,601	538,908	606,900	Electrical appliances for aeroplanes, n.e.s.	357,244	1,026,529	955,989
Motor starting and controlling gear	236,542	984,516	799,739	Ditto, for motor vehicles, n.e.s.	676,782	1,202,373	1,964,543
	3,036,565	8,575,287	8,864,853	Ditto, for cycles, n.e.s.	40,697	118,969	140,364
Converting machinery	30,069	74,756	210,679	Signalling apparatus (incl. traffic signals)	131,087	546,314	398,390
Mercury-arc rectifiers	31,183	147,236	126,742	Instruments, commercial	229,544	560,743	575,269
Transformers for lighting, heating and power (incl. coils):				House service meters (including parts)	173,480	377,007	536,440
Not exceeding 7,500 kVA	467,048	1,696,356	1,488,387	Electro-medical apparatus (not X-ray)	32,057	94,110	111,313
Over 7,500 kVA	296,379	1,329,310	826,313	X-ray apparatus (excl. tubes and valves)	45,866	11,620	156,371
Switchgear and switchboards (not telegraph or telephone), up to 200 A and 600 V	342,036	976,640	1,192,764	Ceiling fans, complete	85,946	281,008	254,340
Ditto, other	1,044,816	3,572,093	3,553,359	Desk fans, complete, and parts of desk and ceiling fans	23,992	37,299	70,189
	2,211,531	7,796,391	7,398,244	Vacuum cleaners	129,642	424,048	428,617
Batteries and/or cells, primary:				Floor polishers	89,157	210,880	240,284
Lighting	114,420	304,541	333,447	Food mixers	49,410	220,896	160,144
Radio	381,110	1,067,871	1,147,667	Hair clippers and dry shavers	136,675	104,099	267,560
Other	39,973	124,824	115,429	Other portable appliances	27,375	61,916	71,941
Parts (excl. carbons)	44,350	126,442	162,521	Parts	148,474	307,599	475,045
Lamps:				Portable electrical tools, incl. parts	222,917	591,617	711,690
Filament, exceeding 28 V	102,484	257,447	300,230				
Ditto, under 28 V	25,717	97,773	95,767	Telegraph and telephone cables and wires:			
Arc lamps, complete*	8,972	37,266	16,616	Submarine	53,635	49,302	1,234,348
Discharge lamps, fluorescent tubes, etc.	78,118	298,712	243,101	Other	555,978	1,303,050	1,482,278
Radio and television, etc., apparatus:				Other descriptions:			
Thyratrons, hot cathode mercury vapour and gas-filled rectifiers (excl. mercury-arc rectifiers), photo-electric cells, stabilising and cold cathode valves, magnetrons, klystrons	47,800	104,646	130,817	Cotton, silk or art. silk insulated	16,608	64,049	61,240
Cathode-ray tubes	68,148	319,365	163,098	Enamel, glass or asbestos insulated	124,805	267,184	327,267
All other	379,296	1,326,073	1,084,909	Paper insulated	660,756	1,728,082	2,010,411
Parts (excluding glass bulbs)	50,330	76,645	114,829	Rubber insulated	313,759	910,406	862,626
Radio and television transmitters	5,956	97,537	117,670	Thermoplastic insulated	264,769	590,185	891,977
Commercial radio and radar equipment	1,585,818	5,025,560	4,352,530	Other	180,829	540,976	628,970
Domestic radio receivers, mains	75,436	318,211	231,848		2,171,139	5,453,234	7,499,117
Ditto, battery	106,682	183,490	247,840	Accumulators for motor vehicles	122,192	398,740	381,677
Ditto, other (incl. car)	25,890	73,301	87,435	Ditto, traction	14,841	62,155	46,906
Radiograms	41,501	82,780	90,326	Ditto, radio and other portable	30,577	63,864	83,585
Television sets	35,257	244,113	188,630	Ditto, other	30,009	182,045	65,652
Public address equipment	104,738	293,484	296,433	Parts and accessories	72,051	206,131	238,565
Other radio and television apparatus, n.e.s.	115,368	221,019	410,832	Electric wiring accessories	215,349	547,139	658,709
Components and parts, n.e.s.	1,085,658	2,332,584	3,155,112	Electrical ceramic ware (incl. insulators), n.e.s.	134,926	317,001	409,646
	3,727,878	10,698,808	10,672,309	Industrial electronic control equipment	138,075	290,223	429,907
Telegraph and telephone installations	499,976	2,203,784	1,788,888	Insulating cloth and tape	70,113	147,077	200,673
Telephone instruments, separately consigned	137,722	292,124	437,487	Other insulating material	170,457	343,888	491,250
Telegraph and telephone parts	659,035	2,417,173	2,343,205	Permanent magnets	73,409	130,941	187,241
Line apparatus for long distance communication	161,085	619,264	832,134	Radio, telegraph and telephone testing equipment, n.e.s.	147,091	359,002	452,782
	1,457,818	5,532,345	5,401,714	Scientific electrical instruments (excl. telegraphic or telephonic, time recorders and time switches)	418,622	979,525	1,294,806
				Electrical machinery, n.e.s.	44,163	124,933	91,975
				Electrical apparatus and appliances, n.e.s.	1,078,511	2,789,674	3,047,934
				TOTAL	19,548,096	55,775,519	60,470,084

* Figures for 1960 are not completely comparable with those for 1959.

TABLE 2.—DISTRIBUTION OF EXPORTS (TABLE 1)

Country	Month of March 1960	Three months ended March	
		1959	1960
Gibraltar	£ 16,236	£ 31,965	£ 51,126
Malta and Gozo	55,161	102,746	152,443
Cyprus	62,848	180,809	214,713
Sierra Leone	28,392	99,528	127,880
Ghana	248,595	575,022	821,409
Nigeria	504,368	1,416,087	1,616,738
Union of South Africa	1,457,722	4,305,449	4,458,587
Rhodesia and Nyasaland	634,068	1,557,038	2,049,195
Tanganyika	58,084	124,301	175,077
Kenya	144,915	487,523	494,728
Uganda	29,673	162,904	98,892
Mauritius	47,951	123,320	164,453
Aden	84,122	194,582	173,444
Bahrain, Qatar and Trucial States	68,227	344,250	312,447
Kuwait	202,753	596,565	702,214
India	1,453,649	4,898,595	4,287,781
Pakistan	341,107	816,287	971,167
Singapore	212,758	841,612	667,282
Federation of Malaya	230,098	860,998	635,344
Ceylon	201,191	622,204	508,774
British North Borneo	15,529	62,027	82,572
Sarawak	12,108	61,302	56,187
Hong Kong	349,768	1,105,556	1,195,095
Australia	1,731,952	4,207,735	5,100,806
New Zealand	853,192	2,590,610	2,575,587
Fiji	14,368	104,497	45,509
Canada	1,131,446	2,404,155	2,857,109
Jamaica	140,805	409,224	467,431
Barbados	32,580	109,626	109,550
Trinidad	200,596	328,478	602,711
British Guiana	50,453	273,623	216,697
Other Commonwealth countries	170,784	581,308	576,900
Irish Republic	388,234	848,768	1,180,846
Soviet Union	77,263	301,071	505,941
Finland	150,519	288,115	478,711
Sweden	434,585	1,581,069	1,434,009
Norway	222,191	588,046	617,347
Denmark	451,845	635,884	890,602
Poland	80,665	127,278	260,036
Western Germany	397,704	1,464,950	1,336,139
Netherlands	570,504	2,063,393	1,661,863
Belgium	284,971	1,119,911	778,278
France	341,927	888,494	1,019,804
Switzerland	131,877	439,321	453,512
Portugal	203,357	567,135	748,450
Spain	172,209	554,322	478,246
Italy	414,124	975,064	1,043,992
Austria	78,232	128,238	162,919
Yugoslavia	62,275	236,043	350,724
Greece	87,807	306,242	353,544
Turkey	157,514	163,688	255,317
Belgian Congo	43,375	123,458	154,892
Portuguese East Africa	82,224	52,901	170,379
Egypt	132,486	660,713	317,347
Libya	106,659	269,090	228,844
Morocco (excluding Tangier)	40,758	157,126	69,273
Sudan	129,768	272,446	387,197
Syria	22,016	56,428	91,947
Lebanon	66,061	172,599	207,890
Israel	61,204	302,413	266,766
Jordan	73,371	285,890	237,219
Saudi Arabia	63,625	151,684	178,569
Iraq	219,295	1,160,453	685,900
Iran	231,641	1,022,114	748,081
Burma	61,876	292,569	134,340
Thailand	36,679	332,757	135,982
Indonesia	57,510	62,095	234,011
China	105,066	171,849	469,637
Japan	49,598	208,807	154,323
United States of America	955,252	2,448,302	4,202,447
Cuba	33,801	119,176	81,678
Mexico	158,863	113,881	418,928
Colombia	24,238	85,812	154,015
Venezuela	528,901	1,118,224	1,421,011
Peru	32,294	59,181	94,321
Chile	31,383	398,682	237,670
Brazil	39,572	127,412	133,603
Uruguay	10,723	35,166	63,161
Argentine Republic	261,812	365,741	1,012,668
Other foreign countries	394,743	1,291,592	1,197,857
TOTAL	19,548,096	55,775,519	60,470,084

TABLE 3.—SOURCES OF ELECTRICAL IMPORTS

Country	Month of March 1960	Three months ended March	
		1959	1960
Australia	£ 19,783	£ 131,868	£ 87,252
Canada	143,155	205,116	335,036
Other Commonwealth countries	162,677	288,805	520,357
Irish Republic	118,415	239,262	301,793
Sweden	119,573	346,667	319,479
Denmark	90,461	154,369	228,548
Western Germany	873,028	1,556,413	2,446,766
Netherlands	613,446	1,361,714	1,865,550
Belgium	40,129	124,283	140,045
France	154,403	408,107	431,711
Switzerland	206,455	330,312	468,496
Italy	181,167	223,964	424,278
United States of America	1,512,159	2,380,602	4,169,476
Other foreign countries	223,745	398,700	623,286
TOTAL	4,458,596	8,150,182	12,362,073

ing machines, 24 per cent more "portable electrically-driven mechanical appliances," including vacuum cleaners, food mixers and dry shavers, and 17 per cent more cooking and heating appliances were exported. Exports of hair clippers and dry shavers were 160 per cent higher in the first quarter than a year earlier.

According to the Board of Trade, the level of United Kingdom trade in March was seasonally high, but after adjustment to take account of variation in the length of the working month and the normal seasonal rise, both imports and United Kingdom exports were less than in January and February. There is, however, no reason to believe that the underlying trend in either is other than upward. Territorially, the biggest contributions to the increase in total exports were the £14 million increase in exports to Western Europe, and the £13 million increase in shipments to the Commonwealth.

Electrical goods valued at £4.5 million were imported into the United Kingdom in March. This brought the total for the first quarter to £12.4 million, or 52 per cent more than in the corresponding quarter of last year. There were particularly large increases in imports of convertors, transformers and switchgear, 128 per cent; magnetos and other electrical equipment for motor vehicles and aircraft, 98 per cent; motors, 44 per cent; and radio apparatus and valves, 32 per cent.

TABLE 4.—OTHER ELECTRICAL AND ALLIED EXPORTS

Class	Month of March 1960	Three months ended March	
		1959	1960
	£	£	£
Domestic electric washing machines, incorporating centrifugal water extraction	238,378		441,503
Other, with or without wringers	171,785	874,788	980,714
Dryers (exported as separate units)	27,634		139,722
Parts	89,110	245,656	297,210
Electric locomotives (incl. battery types)	243,858	1,414,689	900,946
Diesel locomotives with electric transmission	343,434	489,171	527,720
Welding electrodes:			
Ferrous	114,697	214,612	409,808
Non-ferrous	20,960	64,818	78,954
Electric conduit tubes and cased tubes	89,975	175,348	245,803
Electric carbons	100,895	285,058	316,369
Electric lighting fittings and lanterns (excl. arc lamps, searchlights and cycle lamps)	363,695	825,111	1,016,034
Electric fork-lift trucks	96,835	248,260	285,412
Water and gas turbine, etc.	386,349	1,016,837	1,431,527
Steam turbines	489,670	305,396	657,633

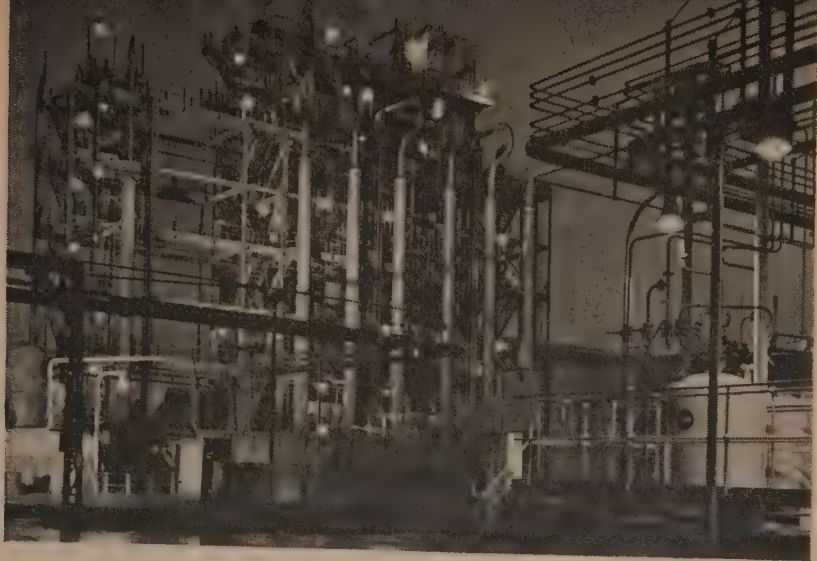
TABLE 5.—ELECTRICAL IMPORTS

Class	Month of March 1960	Three months ended March	
		1959	1960
	£	£	£
Generators, incl. parts	75,161	194,013	179,538
Motors, incl. parts	180,818	348,167	496,224
Converters; transformers; rectifiers*	252,783	233,415	601,628
Switchgear and switchboards (not telegraph and telephone)	171,622	243,156	484,750
Cathode ray tubes, complete	46,979	232,648	132,663
Other valves, complete*	327,406	682,699	980,912
Parts (excl. glass bulbs)*	75,336	173,134	407,966
Radio receiving sets, domestic or portable	53,338	38,100	113,860
Radio communication and navigational aids, complete	470,199	998,441	1,388,137
Other radio and T.V. apparatus, parts and accessories	436,514	940,849	1,029,479
Apparatus for telegraphy and telephony	72,091	214,566	163,124
Welding machinery	65,598	111,386	205,720
Cooking and heating apparatus	238,547	371,396	512,802
Magnetos, ignition, and electric appliances for aeroplanes, motor vehicles and cycles	288,598	450,307	890,155
Electro-medical apparatus (incl. X-ray apparatus)	193,321	306,161	379,675
Portable mechanical appliances, electrically operated, complete	105,580	298,386	337,142
Parts	62,636	157,108	184,252
Scientific electrical instruments (excl. telegraphic and telephonic)	177,149	382,853	546,075
Other machinery, apparatus and appliances	1,164,920	1,773,397	3,326,971
TOTAL	4,458,596	8,150,182	12,362,073

* The figures for 1960 are not completely comparable with those for 1959

Silicone Rubber Manufacture

The distillation columns of the Midland Silicones factory at Barry



THE new silicone rubber production plant of Midland Silicones, Ltd., at Barry, has now been in operation for several months and last week we had the opportunity of inspecting it. We also saw the new laboratory block where research and technical service facilities have been established.

Because it is essential to maintain a very high standard of purity in "Silastomer" silicone rubber, the layout and equipment in the silicone rubber plant were designed with particular care. Air is filtered when entering and leaving the building and the roof and the floor are made of dust-free materials. The layout of the building, while allowing for future expansion, was conceived in such a manner that operations like the handling of fillers and milling them into the silicone rubber polymer, which inevitably produce some dust, are kept apart from the final stages where the near-finished product is handled. The entire plant was designed by Midland Silicones and the equipment specially made to the company's specifications.

Working all the year round on a 24-hour-day basis, the plant now turns out some six dozen different silicone rubber products, whereas the former rubber plant handled only about one dozen three years ago. Many of the products now being made have been developed at Barry to meet the individual requirements of various industries.

In the new laboratory block the functions of the process and product development department are divided into three sections:—Process development; product development; and patents and technical information.

The main work of the product development group is to develop new silicone fluids, resins, greases and rubbers,

and to modify existing ones to meet the specific demands of industry. The nature of the work is mainly short-term applied research, though more fundamental work is also being carried out, particularly on organo-silicon intermediates and polymers.

The process development group is concerned with developing manufacturing processes for new and existing products. Its work includes scale-up from laboratory equipment, through pilot plant, to full-scale production, the investigation of current processes with a view to increasing their efficiency, and the design of entirely new processes. The functions of the patents and technical information staff are to write up patent specifications to cover inventions made at Barry, deal with customers' queries regarding patents, and undertake exhaustive patent and information searches before the department enters upon any product or process development projects.

While the product development group and the patents and technical information section with its library share the new laboratory block with technical service department laboratories, the process development group is housed in the building known as the pilot plant. Here production equipment is duplicated on a smaller scale and used mainly for investigation purposes.

Technical service to the customer is an important aspect of the company's activities. A total of thirty-five scientists and technologists are there to help customers to use silicones to the best advantage. Their advice covers techniques, formulating and processing, practical demonstrations and investigation of special problems. This may involve adaptation of products to fit into a customer's production schedules and includes "trouble-shooting" at customers' works.

The new laboratory block at the Midland Silicones factory, Barry. This block, completed earlier this year, houses part of the product and process development department and of the technical service department



GENERATION and DEVELOPMENT

Power Station Efficiencies

A saving of £2,690,000 in fuel costs was made by the Central Electricity Generating Board during 1959 through improved plant efficiency. The overall average thermal efficiency of the power stations operated by the Board was 26.36 per cent during the twelve months, compared with 25.99 per cent for the previous year. Almost one-third of the 90,828 million kWh supplied from these stations was provided by the twenty most efficient stations. These had an average efficiency of 30.67 per cent, their individual percentages being as follows:—

STATION	THERMAL EFFICIENCY %
Blyth "A"	33.88
Agcroft "C"	32.63
Castle Donington	32.52
Ferrybridge "B"	32.18
Drakelow "B"	32.14
Willington "A"	31.96
Drakelow "A"	30.81
Marchwood	30.73
Rogerstone	30.44
Meaford "B"	30.41
South Denes	30.11
Tilbury	30.10
Stourport "B" (H.P.)	30.04
Stella South	29.95
Stourport "B" (L.P.)	29.78
Littlebrook "B"	29.76
Wakefield "B"	29.66
Portishead "B"	29.64
Stella North	29.36
Hams Hall "C"	29.26

Inquiry

The Ministry of Power is to hold an inquiry into a proposal of the Central Electricity Generating Board to erect a 275 kV overhead line at South Shields. The Corporation's main objection is to the line being erected over a housing site.

Easy Payment Facilities in South West

Electricity savings stamps, valued at 2s 6d, are now on sale at all service centres of the South Western Electricity Board, following the success of a pilot scheme at Plymouth. These stamps will be accepted either in settlement or part-settlement of quarterly electricity accounts, or as hire-purchase deposits or instalments.

The public can also now settle their electricity bills by means of a banker's order to pay an agreed fixed sum every month or quarter. An annual adjust-

ment is then made. This scheme helps to even out the payment of quarterly accounts throughout the year. If the consumer wishes, he may arrange for

South Western
Board's savings
stamp



the Electricity Board to collect payment of his quarterly account direct from his bank. A copy of the account will be sent to the consumer to keep him informed.

Cooling Towers for Thorpe Marsh

Film Cooling Towers (1925), Ltd., has been awarded a contract by the C.E.G.B. for three 4,800,000 gallons per hour natural draught cooling towers to be erected at Thorpe Marsh power station. Each tower will be 350ft high. The value of the contract is approximately £600,000.

Street Lighting Servicing

A street lamp servicing vehicle produced jointly by Access Equipment, Ltd., Maylands Avenue, Hemel Hempstead, Herts., and the Harborough Construction Co., Ltd., of Market



The Access Equipment Harbilt "Tallescope" street lighting servicing vehicle

Harborough, can be used as a mechanical access tower, a removable tower for general internal and exterior use, and a mobile and compact general purpose load carrying vehicle. The "Tallescope" can be adjusted for the vertical both laterally and longitudinally to overcome road camber and gradients and has been tested to an angle of 15° out of the vertical. The electrically driven truck has a range of 20-30 miles, and the maximum working height of the platform is 26ft. The vehicle's height with the "Tallescope" in the folded position is 7ft 4in.

Change-over of Last D.C. Supply in Birmingham

At a ceremony at the Midlands Electricity Board's substation in Water Street, Birmingham, on Monday, the Lord Mayor of Birmingham (Alderman J. H. Lewis) stopped a 2,000 kW rotating convertor, cutting off the last d.c. supply in the city. The "switch off" followed completion by the Birmingham Sub-Area of a change-over programme begun by the Birmingham Electricity Supply Department in 1926.

The Lord Mayor was welcomed by the chairman of the Board (Mr. W. S. Lewis), the deputy chairman (Mr. G. F. Peirson) and the manager of the Birmingham Sub-Area (Mr. Emil Braathen). Among others present was the sub-area engineer, Mr. A. C. MacQueen, who has been responsible for much of the change-over work since 1926.

The chairman of the Board said that the ceremony virtually marked the end of one of the biggest jobs that faced the Board in 1948. Then they had 940,000 consumers and 74,000 of them were on d.c.; today they had about 1,400,000 consumers and they now had only one d.c. consumer left, in Leek, Staffs. The Water Street premises had reached the end of their operational life but the convertor would still go on working; it had been sold to the Electric Construction Co., Ltd., for use at their Wolverhampton factory as a piece of test plant. The load previously carried at Water Street was being transferred to Summer Lane, which was re-assuming the importance it had in the old days as the "nerve centre" of the Birmingham electricity system. Besides the control room for the whole of the Birmingham system a 132 kV grid point was being developed there which would become one of the biggest in Britain, with an

[Continued on page 899]

Cubicle Switchboards



by

VARILECTRIC

UNIT CONSTRUCTION

embodying Combination Fused Switches from our ASTA Type Tested 30 MVA range. 60 amperes to 750 amperes. Standardised dimensions permit ease of assembly. Great flexibility of layout and facilities for extensions.

Our other products include:—

- RISING MAIN SYSTEMS
- CABLE TRUNKING SYSTEMS
- OVERHEAD BUSBAR SYSTEMS
- DISTRIBUTION FUSEBOARDS
- COMBINED DISTRIBUTION FUSEBOARDS AND ISOLATORS

Export Inquiries invited
Specialists in meeting climatic conditions

Send us your enquiries and problems

VARILECTRIC
LIMITED

10 MELON ROAD, LONDON, S.E.15

Telephone: Rodney 6895/6/7



The various guises our tubes appear in after they leave us are — to say the least — numerous. The list of industries, let alone products in which they play a part is almost as wide as Industry itself. A few samples: Refrigeration; Electrical and Allied Industries; Radio and Electronics. General Engineering. In products just let's say Ellay Small Diameter non-ferrous tubing are found everywhere small metal tubing is used.

Our output of small aluminium tubes includes:—

Tubes from 3/64" to 5/8" o.d.

From 3/32" to 20 ft. lengths.

From 0.006 to 0.064 wall thickness.

In general purpose, close or precision tolerances.

In super purity, commercial purity or alloys.

we hardly recognise ourselves

Everyone has a use for

ELLAY

Tubes

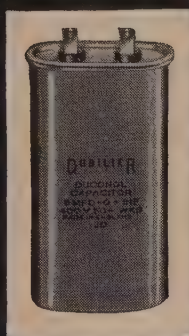
We also supply tubes in copper and brass, and precision tubular parts in non-ferrous metals to your specification.

ELLAY TUBES LIMITED

LTD

COX GREEN WORKS, MAIDENHEAD, BERKS. TEL: MAIDENHEAD 3303

DUCONOL THE SAFE CAPACITOR...



Dubilier 'Duconol' Fluorescent Lighting Capacitors are absolutely safe.

The 'Duconol' dielectric impregnant is non-inflammable. They are hermetically sealed in seamless drawn aluminium containers with double sealed tops to render them leakproof.

'Duconol' capacitors are compact and designed to meet the stringent conditions of fluorescent lighting installations.

They may be operated safely at their rated voltage in an ambient temperature of up to 70°C.

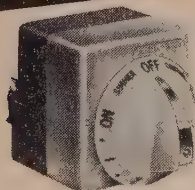
DUBILIER

DUBILIER CONDENSER CO. (1925) LTD.,
DUCON WORKS, VICTORIA ROAD,
NORTH ACTON, LONDON W.3.

Phone: ACOrn 2241. Grams: Hivoltcon Wesphone London
DN230

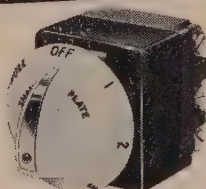
The 'Diamond H' range of Controls for domestic and Industrial applications

ENERGY REGULATORS



3 kW 250 volt AC only infinitely variable controls with indexed 'OFF' and 'FULL' positions. Single pole and double pole, single circuit: single pole two circuit types available for rear wiring and side wiring

HEATER SWITCHES



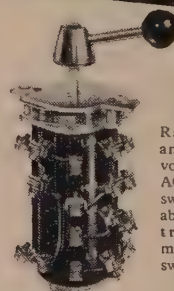
15 amp 250 volt AC/DC and AC only multi-heat 4/7 position flush mounting rotary reciprocating heater switches—for cookers, washing machines and other domestic appliances

THERMOSTATS



Single, two and three stage oven thermostats of the hydraulic type. Low voltage or neon pilot lights, circular escutcheons, shallow projection Rear or side wired terminals.

PACKET SWITCHES



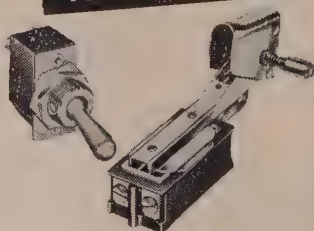
Rated at 5/60 amps. 250/600 volts, AC/DC and AC only, these switches are suitable for rectifiers, transformers, machine tools, switchboards, etc.

MINIATURE RELAYS



Series BR miniature hermetically sealed 4 pole double throw high performance relays. Extremely good shock and vibration resistance, wide temperature range. For aircraft, guided weapons, computers, etc.

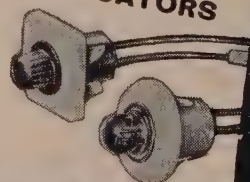
TOGGLE SWITCHES



Comprehensive range available. Ratings 1.5 amps to 60 amps. 250 volt AC/DC, for aircraft, machine tools and domestic appliance applications

*Introducing THE 80A MINIATURE SNAP-IN NEON INDICATORS

Snap-in neon indicators suitable for circular or square panel mounting holes. New miniature series — white, cream or black facia plates, —clear, amber or red lens. 1 watt. 230/250 volts, AC/DC.



'DIAMOND H' SWITCHES LTD. GUNNERSBURY AVENUE, CHISWICK, LONDON, W.4.

Telephone: Chiswick 8444 Grams: Diamonhart Chisk, London

eventual capacity of 240 MW. The Board also proposed to erect at Summer Lane new headquarters for the Birmingham Sub-Area.

Farm Electrification

Members of the staff of the Merseyside and North Wales Electricity Board have this week been attending a course on farm electrification at the Glynllifon Agricultural Institute, Caernarvon. The course has been designed to equip them with knowledge of farm problems which will enable them to help the farmers of the area to make the best possible use of electricity. Instruction, in the form of lectures,

has been given by experts of the National Agricultural Advisory Service, the Agricultural Department of Bangor University and the Electricity Council, and the students have also been engaged on practical work.

OVERSEAS

Loan for Damodar Project

According to the New Delhi correspondent of the *Financial Times*, the United States has advanced \$73 million, including \$30 million through the Development Loan Fund, to India to finance a 250 MW thermal power plant in the Damodar Valley area.

With the exception of two generators, the equipment may be imported from any country.

Nationalisation in Mexico

The Mexico City correspondent of *The Times* reports that the Mexican Government has purchased seven provincial electricity companies, all affiliated to the American and Foreign Power Co., Inc. The purchase price is over £23 million plus the value of works under construction. All the payments, to be made over 15 years, are to be reinvested in Mexico. The purchase helps to fulfil the Mexican policy of nationalisation.

HOTPOINT WASHER/SPIN DRYER

A COMBINED washing machine and spin dryer has been introduced by A.E.I.-Hotpoint, Ltd. The new machine, the Hotpoint "Supermatic," will be on sale in Scotland only, from the end of May, and distribution will then be widened at regular intervals to take in other areas of Great Britain. An exclusive feature of the machine is its "filter-clean" system which constantly circulates the washing water through a filter tray, thus ensuring that the clothes are cleansed in water free from fluff, etc. The filter tray, which additionally provides a receptacle for the washing powder, is fitted to the top of the plastic gyrator. When the machine is in use, this means that not only is the powder completely dissolved before coming into contact with the clothes but that the whole of the washing water is progressively pumped through the filter tray. The washing tub itself holds up to 9 gal of water and washes between 4 and 6 lb dry weight of clothes at one time. It has a blue vitreous enamel finish and is fitted with a 2.3 kW heater, thermostatically controlled.

The control panel incorporates coloured bands, which indicate the correct washing time and water temperature for the various types of fabrics to be washed. It is only necessary to turn the heater and timer knobs to the required colour bands and the right combination of water temperature and washing time is obtained. A pilot light indicates when the selected temperature has been reached. Twelve minutes is the maximum washing time but the user has, of course, complete freedom of choice of both the temperature and washing time selected.

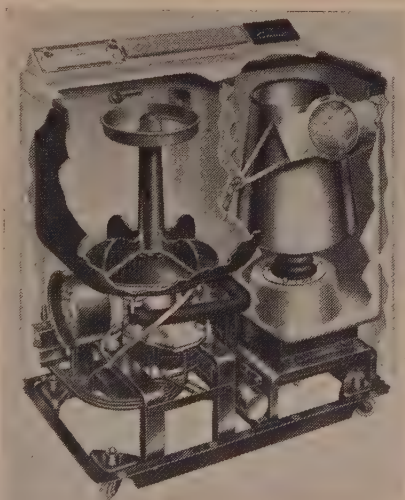
The spin dryer is extra quiet in operation, is directly driven at 2,850

r.p.m. and is capable of dealing with a 6 lb dry weight load of clothes at one time. It is fitted with a transparent domed lid and the act of opening it applies the braking system to the spinner drum.

The spinner drum is conical shaped and is constructed of aluminium. It is smooth sided and the drainage holes are in the base. A balance ring is incorporated to reduce out-of-balance vibration to the minimum and careful packing of the drum is claimed to be unnecessary. The machine is also fitted with an adjustable built-in pipe

which transfers the extracted washing water back to the wash tub, or, when rinsing, directs the water into the sink. The spinner drive motor is a $\frac{1}{8}$ h.p. built-in capacitor start machine.

The "Supermatic" measures 32in high (34in over control panel) by 30in wide by 18in deep and the exterior finish is in either white or cream stoved enamel. The whole is mounted on swivelled castors for easy manoeuvrability and, being fitted with flat top twin lids, provides an extra table top surface. The price is £75 3s 2d plus £14 1s 10d purchase tax in the U.K.



A.E.I.-Hotpoint "Supermatic" washing machine/spin dryer being demonstrated. In the cut-away view the chassis-mounting arrangement for the mechanism is shown. The spinner drum and safety lid, which operates the motor switch for automatic braking, can also be seen



NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (3s 6d each including postage) are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2

- 1955
1211. Siemens & General Electric Railway Signal Co., Ltd., and Riddle, H. J. N.—Electrical timing devices. 13th April, 1956. (833202.)
5353. British Aluminium Co., Ltd.—Electric measuring instruments. 22nd February, 1956. (833203.)
12104. Electric & Musical Industries, Ltd.—Cathode-ray display tube circuits. 19th April, 1956. (833206.)
12552. British Telecommunications Research, Ltd.—Phase modulators. 13th April, 1956. (Addition to 731913.) (833331.)
- 15414/5. Morgan Crucible Co., Ltd.—Electric commutator or slip-ring brush. 25th May, 1956. (Cognate application 25029, 31st August, 1955.) (832903/4.)
17085. Pye, Ltd.—Applying solder to an electric circuit on a plate or the like. 14th June, 1956. (833333.)
21604. Hivolt, Ltd.—Electrical power unit. 1st February, 1956. (833210.)
21899. Mullard Radio Valve Co., Ltd.—Photo-electric cells. 29th October, 1956. (832912.)
23213. Painton & Co., Ltd.—Electrical resistors. 10th August, 1956. (833211.)
25274. English Electric Co., Ltd.—Mounting arrangements for low-oil-content electric circuit interruptors. 31st August, 1956. (832969.)
32703. Painton & Co., Ltd.—Electrical plug and socket connectors. 15th November, 1956. (Addition to 700999.) (832970.)
33069. Beer, D. C.—Snap-action electric switches. 19th November, 1956. (833336.)
36340. British Thomson-Houston Co., Ltd.—Multi-cavity magnetrons. 12th December, 1956. (832971.)
37446. British Thomson-Houston Co., Ltd.—T.R. switches. 8th February, 1957. (833338.)
- 1956
507. Roscoe, E.—Electrical testing apparatus for protective earthing. 15th March, 1957. (833339.)
555. Allgemeine Elektrizitäts-G.m.b.H.—Protective arrangement for high voltage power distribution systems. 4th January, 1957. (832972.)
582. Morgan Crucible Co., Ltd.—Electrical contact brushes. 28th June, 1956. (832905.)
1345. Shaw, J. S.—Electric plugs. 3rd April, 1957. (833222.)
2124. Volex Electrical Products, Ltd., and Hughes, J. G. K.—Electric plug and socket adaptors. 18th February, 1957. (833224.)
2293. Philco Corporation.—Gettering units for electronic tubes. 24th January, 1956. (833215.)
2888. Montecatini Soc. Generale per l'Industria Mineraria e Chimica.—Electrical components and other bodies with negligible temperature coefficient of expansion. 30th January, 1956. (833216.)
3684. Gall, D. C.—Electric switches. 7th March, 1957. (833226.)
3819. British Thomson-Houston Co., Ltd.—Cathode-ray tube display apparatus. 7th February, 1957. (832973.)
4689. Square D Co.—Electrical power distribution apparatus. 15th February, 1956. (833219.)
4951. Volex Electrical Products, Ltd., and Hughes, J. G. K.—Electric twin-outlet socket fittings. 18th February, 1957. (833225.)
5704. B. & H. Instrument Co., Inc.—Slide wire potentiometers. 23rd February, 1956. (833347.) 11403. 13th April, 1956. Addition to 833347. (833351.)
7487. General Electric Co.—Thermocouples. 9th March, 1956. (832975.)
- 8360 and 10348. Hunt (Capacitors), Ltd., A. H.—Capacitors. 18th March and 4th April, 1957. (833228/9.)
8458. Brown, Boveri & Cie. A.G.—D.c. high current installations or systems. 19th March, 1956. (833220.)
12121. English Electric Co., Ltd.—Semi-conductor rectifier units. 18th April, 1957. (832979.)
12428. Soc. le Carbone-Lorraine.—Carbon-cathode arrangements for high intensity electric arcs. 23rd April, 1956. (833354.)
13420. Young, L. J.—Printed circuits. 1st April, 1957. (832981.)
15461. Yardney International Corporation.—Electrode for a primary or secondary electric cell or battery. 17th May, 1956. (832982.)
15919. Tournau-Westinghouse Co.—Field current supply system for an alternator. 23rd May, 1956. (832683.)
16112. Siemens & Halske A.G.—Time-division multiplex telegraph receivers. 24th May, 1956. (832632.)
16277. General Electric Co.—Apparatus for measuring electric low resistance values. 25th May, 1956. (832684.)
16438. Robertshaw-Fulton Controls Co.—Timer control device for controlling the sequential operation of control members formed by fluid control valves or electric switches. 28th May, 1956. (832770.)
16799. Rolls-Royce, Ltd.—Plug and socket type electrical connectors. 30th May, 1957. (832515.)
17764. Westinghouse Electric Corporation.—Electrical insulations. 8th June, 1956. (832965.)
19511. Kabelwerk Duisburg A.G.—Telecommunication cables. 23rd June, 1956. (832687.)
20483. E.S.A.B., Ltd.—Coated electrodes for electric arc welding. 2nd July, 1956. (833239.)
21336. Novotny, B.—Electromagnetic switching device. 10th July, 1956. (832775.)
21883. Pandapas, G. J.—Relay with self-cleaning contact elements. 16th July, 1956. (832690.)
22257. General Electric Co.—High voltage current transformers. 18th July, 1956. (833364.)
22906. Siemens-Schuckertwerke A.G.—Apparatus for operating self-excited compounded synchronous generators in parallel. 24th July, 1956. (Addition to 785664.) (833366.)
23166. Dow Chemical Co.—Primary electric cell. 26th July, 1956. (833367.)
27095. Alford, A.—Coaxial bridge for high frequency electrical transmission lines. 5th September, 1956. (833245.)
28789. Philips Electrical Industries, Ltd.—Automatic frequency control circuit arrangements. 20th September, 1956. (833246.)
29383. Marconi's Wireless Telegraph Co., Ltd.—Cathode-ray tube circuit arrangements. 15th May, 1957. (Addition to 812635.) (832986.)
29702. Fernseh G.m.b.H.—Apparatus for mixing television signals. 28th September, 1956. (833248.)
29852. Philips Electrical Industries, Ltd.—Electron microscopes. 1st October, 1956. (833249.)
32725. General Electric Co.—Electric supply systems. 26th October, 1956. (833255.)
34205. Southern United Telephone Cables, Ltd.—Machines for twisting together electric conductors. 15th November, 1957. (832917.)
34523. Philips Electrical Industries, Ltd.—Frequency converters. 12th November, 1956. (832997.)
36614. Blaupunkt-Werke G.m.b.H.—Printed circuits. 30th November, 1956. (833000.)
36887. Egyesült Izzolampa es Villamossagi R.T.—Electroluminescent cells. 3rd December, 1956. (833001.)
38014. Submarine Cables, Ltd.—Submarine signalling cables. 11th December, 1957. (833004.)
38558. Standard Telephones & Cables, Ltd.—Electric counting circuits. 18th December, 1956. (833368.) 38559. Translating stored data into a code. 18th December, 1956. (833369.)
39488. General Electric Co.—Coil formers and methods of securing such coil formers to printed circuits. 28th December, 1956. (833005.)
- 1957
1006. Chromatic Television Laboratories, Inc.—Methods of coating cathode-ray tubes with luminescent material. 10th January, 1957. (832535.)
1385. British Telecommunications Research, Ltd.—Electronic computing equipment. 13th January, 1958. (833006.)
2124. Philips Electrical Industries, Ltd.—Ferromagnetic materials, more particularly for ferromagnetic bodies for use at frequencies of at least 50 Mc/s, methods of manufacture, and ferromagnetic bodies consisting of such materials. 21st January, 1957. (833007.)
2456. Geiger G.m.b.H., W.—Electric switches. 23rd January, 1957. (833265.)
2528. McLean, G. O.—Electric transformer coolers. 21st January, 1958. (832920.)
2660. Glover & Co., Ltd., W. T., Fibreglass, Ltd., and British Resin Products, Ltd.—Electric cables. 23rd January, 1958. (832797.)
3472. General Electric Co., Ltd.—Electric lighting fittings. 28th April, 1958. (832921.)
3655. Thorn Electrical Industries, Ltd.—Circuits for electric discharge lamps. 31st January, 1958. (832541.)
7603. Svenska Aeroplan A.B.—Computers. 7th March, 1957. (832704.)
8837. Soc. Technique pour l'Industrie Nouvelle S.A. Stin.—Control of electromechanical apparatus. 18th March, 1957. (832543.)
10040. General Electric Co., Ltd., and Ferroconcrete (Lancashire), Ltd.—Reinforced concrete columns. 20th June, 1958. (832810.)
10259. Morganite Resistors, Ltd.—Combined potentiometer and switch. 28th March, 1958. (832547.)
10351. Hanzelin, F., Stanka, V., and Alexa, L.—Electric d.c. motor. 29th March, 1957. (832548.)
10931. Compagnie Générale d'Electroceramique.—Capacitors. 3rd April, 1957. (832550.)
11585. Stein & Atkinson, Ltd.—Electric soaking pit or furnace. 9th July, 1958. (832642.)
14398. British Oxygen Co., Ltd.—Fluid-pressure responsive electric switch. 30th April, 1958. (832819.)
15125. Fernseh G.m.b.H.—Electric motor control apparatus. 13th May, 1957. (Addition to 769367.) (832714.)
15422. Telephone Manufacturing Co., Ltd.—Electrical components. 8th May, 1958. (832824.)
16220. General Electric Co., Ltd.—Photo-conductive substances. 14th April, 1958. (832717.)

[Continued on page 901

He's on a good thing



It only needs one eye to see that the (A.S.C.M.) quality is everything that "England expects".

A.S.C.M. MEMBERS

General Electric Co. Ltd.
(Incorporating The Oriental Tube Co. Ltd.)

Metallic Seamless Tube Co. Ltd.

Monmore Tubes Ltd.

Simplex Electric Co. Ltd.

Incorporating:
Credenda Conduits Co. Ltd.
Simplex Conduits Ltd.
Stella Conduit Co. Ltd.

Walsall Conduits Ltd.

Associate Members

Electrical Conduits Ltd.

Hildick & Hildick

The Steel Tube & Conduit Co.
(Middlesbrough) Ltd.

ASSOCIATION OF STEEL CONDUIT MANUFACTURERS

96, HAGLEY ROAD, BIRMINGHAM 16

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Australia.—Postmaster General's Department, Melbourne. 26th May. Semiconductor devices. 2nd June. Trunk switchboards. (E.S.B. 11206/60.)* 23rd June. Radio testing instruments. (E.S.B. 11484/60.)*
State Electricity Commission of Western Australia, Perth. 21st July. Boiler feed pump and valve equipment. (E.S.B. 11482/60.)*

British West Indies.—Trinidad and Tobago Electricity Commission, Port of Spain. 16th May. 177 electricity meters. (E.S.B. 10952/60.)* Underground cable and accessories. (E.S.B. 10956/60.)* 3,500 single-phase electricity meters. (E.S.B. 10953/60.)* Transformers, meters and metering equipment, house service distribution boards, underground cables and accessories. (E.S.B. 10954/60.)* House service distribution boards. (E.S.B. 10955/60.)*

Coulsdon and Purley.—U.D.C. 24th May. Sodium street lighting equipment. (See this issue.)

Durham.—County Council. 20th May. Electric lamps and miscellaneous appliances for the year ending 31st August, 1961. (See this issue.)

Ellesmere Port.—Corporation. 19th May. Group "A" street lighting equipment. (See this issue.)

Ethiopia.—Imperial Board of Telecommunications, Addis Ababa. 1st July. Telephone equipment. (E.S.B. 11437/60.)*

Formosa.—Central Trust of China, Taipei. 24th May. Electrical apparatus, including circuit-breakers, switching and shunt capacitors, oil circuit reclosers, trip coils and line sectionalizers. (E.S.B. 10988/60/I.C.A.)* Electrical control gear, fuses and switches. (E.S.B. 10989/60/I.C.A.)* 27th May. Batteries, chargers and rectifiers. (E.S.B. 11250/60/I.C.A.)*

India.—Director General of Supplies and Disposals, New Delhi. 20th May. Switchboard cables. (E.S.B. 10825/60.)*

Ipswich.—Corporation. 23rd May. Group "A" street lighting equipment. (See this issue.)

Iraq.—Directorate of Contracts and Purchases, Ministry of Defence, Baghdad. 6th June. Electrical fittings and accessories, plumbing fittings and materials. (E.S.B. 11419/60.)*

Jordan.—Jerusalem District Electricity Co., Ltd. 15th May. 400 V tailless distribution fuse boards. (E.S.B. 11258/60.)* 33 kV outdoor switchgear. (E.S.B. 11257/60.)* 6.6 kV indoor metalclad switchgear. (E.S.B. 11256/60.)* 6.6 kV ring main units. (E.S.B. 11255/60.)* Transformers. (E.S.B. 11254/60.)*

Kuwait.—Department of Electricity, Water and Gas. 18th May. Street lighting service cutouts. (E.S.B. 11618/60.)* Electric lamps and fluorescent tubes. (E.S.B. 11226/60.)* 21st May. Electrical fittings and cable. (E.S.B. 11621/60.)* 22nd May. Conductor wires and cables. (E.S.B. 11227/60.)* 25th May. Fluorescent lighting fittings. (E.S.B. 11234/60.)*

* This information is extracted from the Board of Trade Export Service Bulletin. Inquiries should be addressed to the Board of Trade, Export Services Branch, Lacon House, Theobald's Road, London, W.C.2 (Telephone: Chancery 4411, Ext. 738), quoting the reference given.

Luton.—Corporation. 20th May. Rewiring of 90 houses, Corncastle Road, Hillborough Road and Farley Hill. Borough architect, Town Hall.

Maidstone.—Corporation. 20th May. Two electrically driven pumping sets for Allington sewage pumping station, Howard Humphreys & Sons, consulting engineers, Victoria Station House, Victoria Street, Westminster, London, S.W.1.

Manchester.—City Council. 25th May. Electrical installation in Royle Green Infants' School, Northenden. City architect, P.O. Box 488, Town Hall.

Newcastle-upon-Tyne.—Coquet Water Board. 13th June. Switchboards and transformers for Warkworth filtration works and pumping station. (See this issue.)

New Zealand.—G.P.O., Wellington. 27th May. Cable. (E.S.B. 10972/60.)* 16th June. Copper wire. (E.S.B. 10968/60.)* 100 electric clocks. (E.S.B. 11625/60.)* 17th June. Electrical adhesive tape. (E.S.B. 10973/60.)* 23rd June. Cartridge fuses, fuse holders and fuse wire. (E.S.B. 10969/60.)*

New Zealand Electricity Department. 2nd August. Transmission line towers. (E.S.B. 11637/60.)*

Auckland Electric Power Board. 20th May. Paper insulated cable. (E.S.B. 10980/60.)* Pilot cable and accessories. (E.S.B. 10979/60.)*

Pakistan.—West Pakistan Water and Power Development Authority, Lahore. 15th May. Electrical measuring and testing instruments. (E.S.B. 11275/60/I.C.A.)*

Director General, Department of Supply and Development, Karachi. 16th May. Cables, sleeves and cotton tape. (E.S.B. 11475/60.)*

Excelsior Textile Mills, Montgomery. 16th May. Electric motors, switches, circuit-breakers and starters. (E.S.B. 11630/60/I.C.A.)*

South Africa.—Union Tender Board, Pretoria. 2nd June. 300 magneto extension bells. (E.S.B. 10965/60.)*

Southend-on-Sea.—Corporation. 23rd May. Electrical installation at Fairfax High School for Boys. 27th May. Electrical installation at Hinguar Primary School. (See this issue.)

Sudan.—Sudan Railways Stores Department. 26th May. Electrically heated oven. (E.S.B. 11210/60.)*

Thailand.—Metropolitan Electricity Authority, Bangkok. 23rd May. Electric cable. (E.S.B. 11246/60/I.C.A.)*

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors

Acton.—Six-storey block of buildings for Brunel College of Technology (£389,000); Middlesex county architect, 1, Queen Anne's Gate Buildings, London, S.W.1.

Ballyclare.—Factory; Jeremiah Ambler (Ulster), Ltd., 110, Scottish Provident Buildings, Belfast.

Bedlington.—Shopping centre (48 shops) for the U.D.C.; A. K. Dennis, surveyor.

Birmingham.—Dwellings (70), Warwick Road, Tyseley, and additions and improvements to Town Hall (£116,000); A. G. Sheppard Fidler, city architect, Civic Centre, 1.

Glasgow.—Langside College of Further Education (£465,000); Boissevain & Osmond, architects, Kings Shade Walk, Epsom, Surrey.

London.—Bank premises, Gracechurch Street; Whinney, Son & Austen Hall, architects, 37, Norfolk Street, W.C.2.

Showrooms, High Road, Kilburn, for Lilley & Skinner, Ltd.; Garmack & Co., Ltd., Berkley House, Berkley Grove, N.W.1.

Training school for nurses, Ogle Street, St. Marylebone, for Middlesex Hospital; Young & Hall, architects, 9, Southampton Row, W.C.1.

Longbenton.—Extensions to research laboratories for Thomas Hedley & Co. (£40,000); R. Bowey & Son, builders, William Street, South Gosforth.

Mill Hill.—Church, Salcombe Gardens; J. Stanley Beard, Bennett, Wilkins & Partners, architects, 101, Baker Street, London, W.1.

Newbury.—Church, Cromwell Place; Campbell-Cooper, architect, 41, Cheap Street.

Newcastle-on-Tyne.—Factory for making machine tools; T. B. Pearson & Son (Engineers), Ltd., Wincombe Road.

North Riding.—Eight new primary schools and instalments of five secondary modern schools (£750,000); county education architect, County Hall, Northallerton.

Oldbury.—Houses (78), Lodge Street and Stone Street development; Wood, Kendrick & Williams, architects to Council, 57, Colmore Row, Birmingham.

Plymouth.—Secondary modern school, Ford estate; Hill & Lang, Ltd., 32, Wolston Street.

Portsmouth.—Works and offices, Western Road; Rigbys, Ltd., 7/9, Durham Street.

Scarborough.—Proposed girls' modern school for North Riding E.C.; J. H. Napper & Partners, architects, 133, Osborne Road, Newcastle-on-Tyne.

Slough.—Factory and offices, Twines Lane; Modern Wheel Drive, Ltd., Stanley Avenue, Chesham.

Two-storey extension to Town Hall; borough engineer, Town Hall.

Smethwick.—Library, 17 shops with dwellings over, and eight-storey block, Price Street area; borough engineer, Council House, Smethwick, Staffs.

Southampton.—Three-storey block as phase one of central health clinic in East Park Terrace; borough architect, Civic Centre.

Stockton-on-Tees.—Flats (20) and maisonnettes (40), central redevelopment area; T. C. Hartley, borough architect, 28, The Square.

Sunderland.—Clothing factory, for Jackson the Tailor, Ltd. (£250,000); Shield Brothers, builders, Swalwell, Co. Durham.

Works extensions; James A. Jobling & Co., Ltd., Wear Glassworks.

Thornton Heath.—First stage of scheme of developments at Mayday Hospital (£293,780); R. Mellor, architect to South West Metropolitan Regional Hospital Board, 76, Wimpole Street, London, W.1.

Tipton.—Houses (52), Aston Street site; borough housing architect, Municipal Buildings, Sedgley Road West.

Tunbridge Wells.—Fire station, Grove Hill Road; county architect, Springfield, Maidstone.

Walsall.—Works and offices, Dryers Road; W. F. Parsonage & Co., Ltd., 42, Park Road.

Junior Department for Hatherton Lane School; borough surveyor.

Warwick.—Houses (34), West End clearance area; Jackson & Edmonds, architects to Council, 116, Colmore Row, Birmingham.

Widnesbury.—Development of Balls Hill site for housing; G. F. Thompson, town clerk, Town Hall.

Wellingborough.—First instalment of Technical College (£93,681); A. J. G. Potter & Son, Ltd., Stanwick, Northants.



KARIBA at 330 kV.

All the bushing porcelains for the 330 kV.
circuit breakers

All the 330 kV. strain insulators for the
substations

and the 330 kV. post insulators for some of
the substations
by

BULLERS

MAIN CONTRACTORS · A.E.J. CO.

CONSULTING ENGINEERS · MERZ & McLELLAN.



The illustrations show a
complete 330 kV. bushing
insulator and a 330 kV.
circuit breaker, by
courtesy of the A.E.I. Co.

BULLERS LIMITED · MILTON · STOKE-ON-TRENT · STAFFS

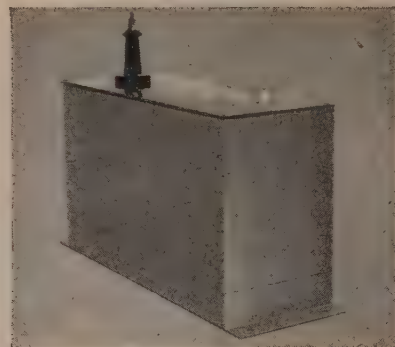
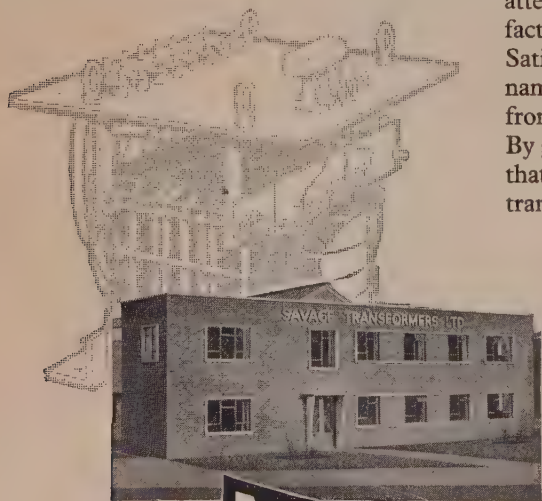
Telephone: Stoke-on-Trent 54321

London : 6, Laurence Pountney Hill, E.C.4. *Telephone : MANsion House 9971*



You can buy honesty

Honesty—they say—is the best policy. We have always found this so in the building of transformers, for Savage transformers are an honest job, they look good and *are* good. We are very fussy about what goes into them and for this reason make as many of the components as possible in our own workshops. Illustrated is a corner of our metal-working shop where we are turning out transformer cases, some of which have to hold vacuum down to 1 mm. of mercury. Only by meticulous attention to details can this little factory maintain its big reputation. Satisfied customers have spread our name across the world—one enquiry from California began "Gentlemen: By good authority we have been told that you make some of the best transformers ever made. . . ."



The transformer illustrated above gives an output of 500 watts at 10 KV, at frequencies between 4000 c.p.s. and 9000 c.p.s.

If you have a transformer problem, however complicated or simple, write to

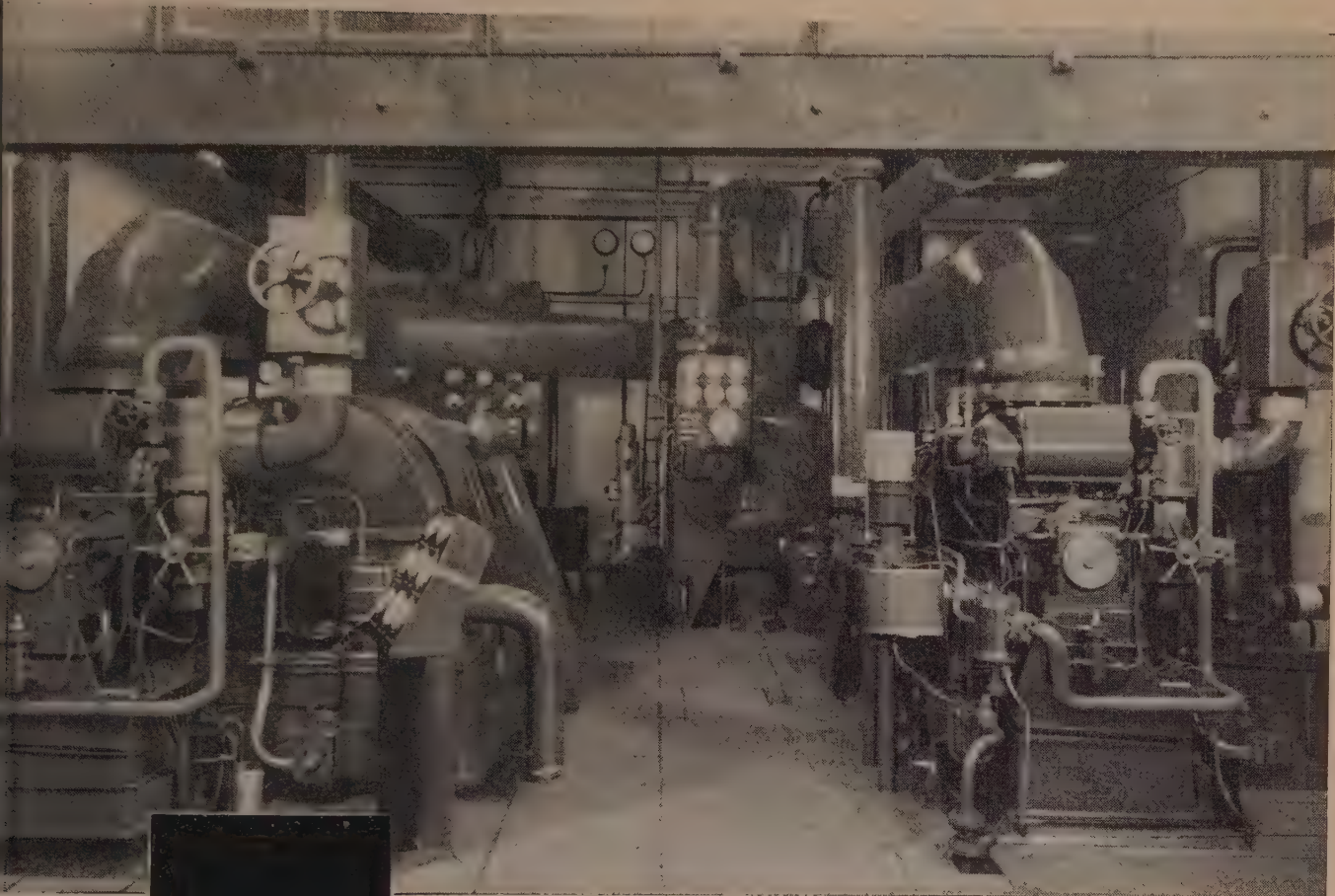
**THE LITTLE FACTORY
WITH THE BIG REPUTATION**

**SAVAGE TRANSFORMERS LIMITED
NURSTEED ROAD, DEVIZES, WILTS**

Tel: Devizes 932

MASSICORE
SAVAGE

POWER PLANT FOR INDUSTRY



Two Brotherhood extraction type
turbo-generating sets, one A.C. the other D.C.,
normal rating of each 600 kW.

PETER BROTHERHOOD LTD

PETERBOROUGH, ENGLAND

Compressor and power plant specialists for nearly a century

Two New Water Heater Control Switches

Volex

**D.P. INSULATED
SWITCHES**
WITH EARTH TERMINAL

**WITH SELF-CONTAINED
MOUNTING BLOCKS**

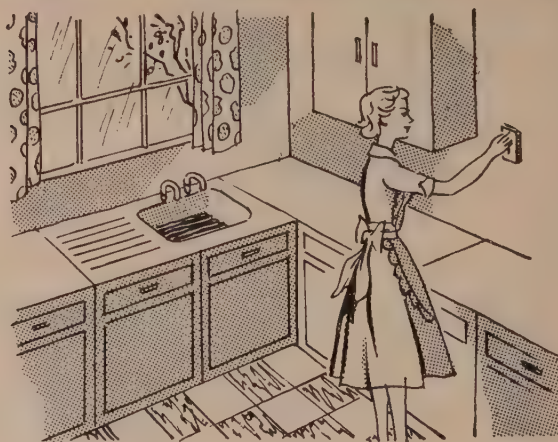
20 AMP. A.C.

V/5303	Without Pilot light ...	6/8d. each
V/5303CR	„ „ Cream	7/8d. „
V/5304	With Pilot light	9/- „
V/5304CR	„ „ Cream	10/- „

30 AMP. A.C.

V/5203	Without Pilot light ...	7/8d. each
V/5203CR	„ „ Cream	8/8d. „
V/5204	With Pilot light ...	10/- „
V/5204CR	„ „ Cream	11/- „

20 Amp. and 30 Amp.
SURFACE MOUNTING
BROWN OR CREAM FINISH



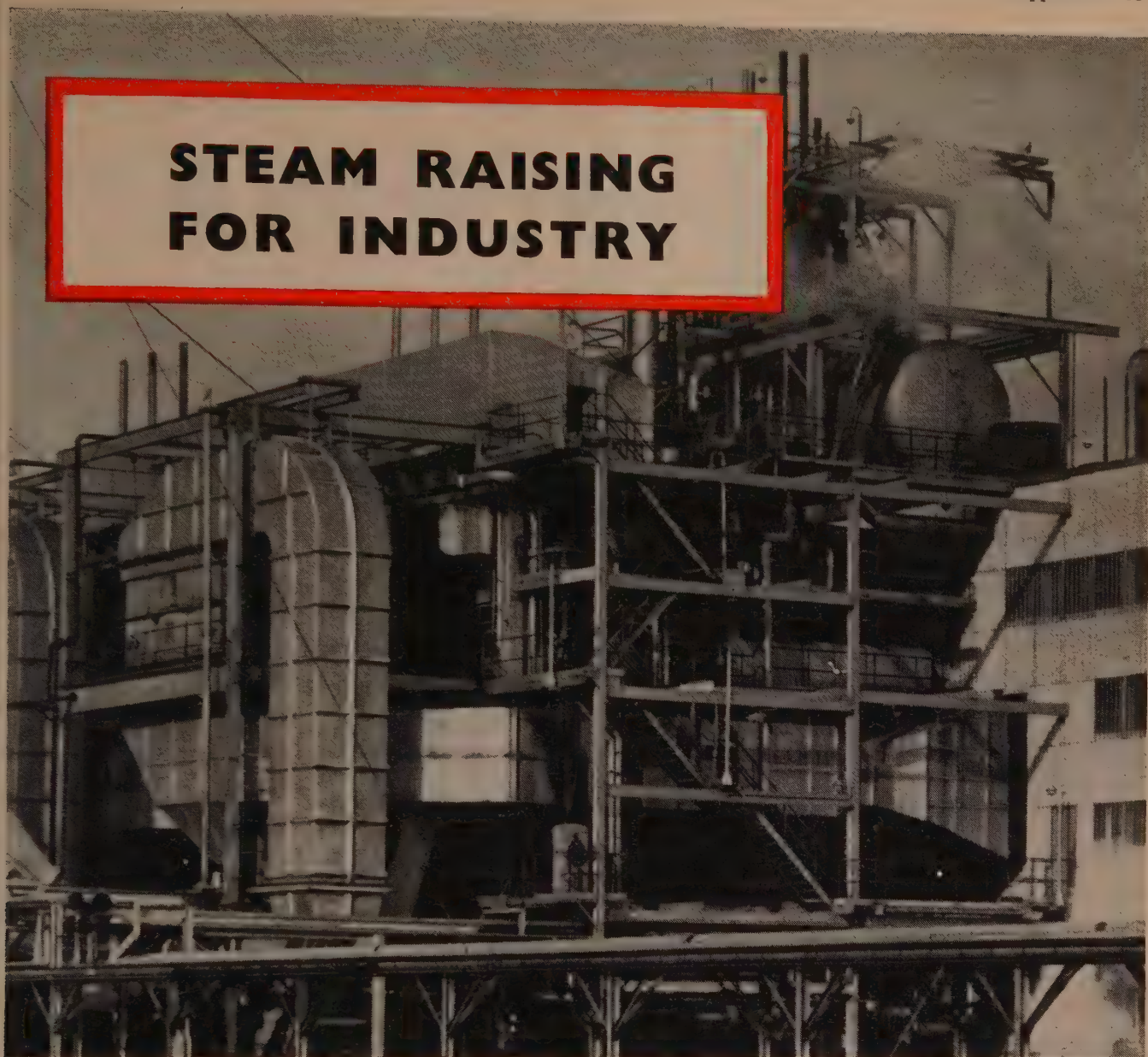
VOLEX ELECTRICAL PRODUCTS LTD.

Telephone: PENDLETON 4373

SALFORD 6

Telegrams: VOLEXPROD, Salford 6

STEAM RAISING FOR INDUSTRY



Photograph reproduced by courtesy of Mobil Oil Company Limited

MOBIL OIL COMPANY LTD, CORYTON REFINERY

3 boiler units each producing 180,000 lbs/hr. at 615 p.s.i. 750°F

INTERNATIONAL COMBUSTION build boilers to suit the individual steam raising requirements of every industry. Whatever the problem, IC steam generating equipment ensures the best use of fuel resources.

WATERTUBE BOILERS FOR OIL, GAS OR SOLID FUEL FIRING

INTERNATIONAL COMBUSTION LIMITED

IC

LONDON OFFICE: NINETEEN WOBURN PLACE · WC1 · TELEPHONE: TERMINUS 2833 · WORKS: DERBY

Member of Atomic Power Constructors Ltd. One of the British Nuclear Energy Groups



AND NOW!

EXCITING new Bendix Refrigerators, superbly designed to give a life-time of silently efficient service, offer you all these advantages.

Light alloy lining provides perfect insulation and refrigeration.

Thermostatic temperature control.

Aluminium, corrosion-proof shelves, easily adjustable.

Full width freezing compartment.

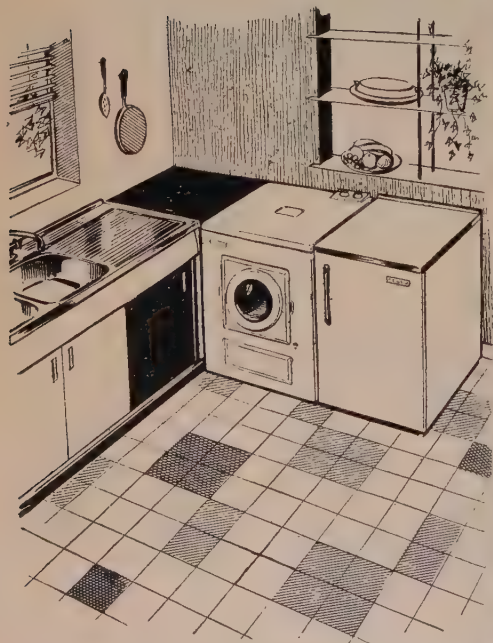
Ice tray with quick action cube ejector.

Big capacity fruit and salad crisper.

Automatic interior light.

Smooth non-slam door latch glides shut on contact.

Inner door with large storage capacity, fitted with bottle bar, egg rack and insulated butter compartment.



BENDIX REFRIGERATORS



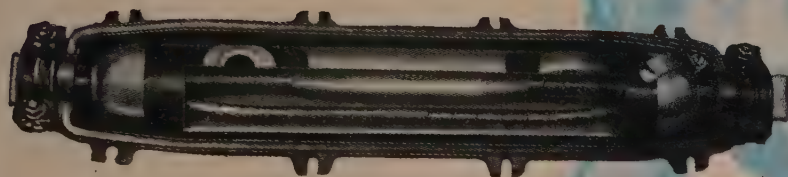
**Four elegantly styled
free-standing models and a compact
table top model are available**

MODEL 983	10 CU. FT.	15 SQ. FT. shelf area
MODEL 683	7 CU. FT.	12 SQ. FT. shelf area
MODEL 593	6 CU. FT.	10 SQ. FT. shelf area
MODEL 401	4.5 CU. FT.	9 SQ. FT. shelf area
TABLE TOP MODEL (illustrated on left)	4 CU. FT.	8½ SQ. FT. shelf area

BENDIX HOME APPLIANCES LTD. (DEPT E.R.) KINGSBURY RD. BIRMINGHAM 24
London Office: 481 OXFORD STREET · LONDON W.1 · Telephone: HYDE PARK 8351

HOMOGENEOUS INSULATION THROUGHOUT!

that's the **Pirelli-General**
paper tube joint



Pioneered by Pirelli-General over 35 years ago, the paper tube joint continues, basically unchanged, to be successfully used for designs up to 330 kV.

There are good reasons for this. Paper tube insulation is homogeneous throughout, ensuring excellent electrical properties and mechanical support of the joint cores, and can be applied with greater tension than paper tapes and at much higher temperatures. It also requires much less handling than other joint insulation methods. Furthermore, the amount of insulation is predetermined for various voltages and is never left to the judgment of the joiner.



PIRELLI-GENERAL CABLE WORKS LIMITED
SOUTHAMPTON AND EASTLEIGH

if you had an all seeing eye

If you had an all seeing eye you would at once realise the importance of Plannair Wafers, for you would be able to observe them simultaneously at work in very many electronic equipments and those of allied fields.

At once you would be impressed by their reliability and adaptability to miniaturised electronic equipment, wherever a small general purpose blower is needed.

Plannair Wafers offer the Design Engineer a compact, lightweight, streamlined and particularly silent answer to problems arising from localised 'hot spots'.

Plannair, as a specialising body, is completely single-minded in its dedication to the solving of air movement and temperature control problems. Plannair contributes the most efficient blowers, weight to output, in the world today. Our knowledge could be of assistance, you think? Then we'd be more than happy to help!



The Plannair Wafer Unit 3PL101-409

TECHNICAL SPECIFICATION:

HOUSING Designed to comply with the Ministry of Aviation requirements to meet the Specification No. 1086B for tropicalisation. In light alloy anodised finish incorporating black moulded rubber resilient mouldings for supporting motor. Terminal block mounted on outside.

DIMENSION $3\frac{1}{4}$ " long, 4" dia. over bell mouth, $4\frac{3}{4}$ " dia. over rear flange.

WEIGHT 1 lb. 6 oz.

IMPELLER Moulded fibre glass.

MOTOR Shaded pole type wound for 110/115 V or 230 V single phase 50 cycles. Consumption 12 watts.

PERFORMANCE 50 c.f.m. under free air conditions.

SPEED 2,600 r.p.m.

NOTE: The Plannair Wafer is available in a number of alternative housings. Send for the Plannair Wafer leaflet which gives full details of units available.



PLANNAIR LIMITED Windfield House, Leatherhead, Surrey.
Tel: Leatherhead 4091/3 & 2231

Carter

hydraulic variable speed gears



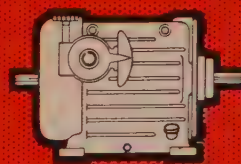
- * Wide infinitely variable speed range (approximately 27/1 on full load).
- * Sensitive accurate speed control by Hand, Electrical or Lever arrangements.
- * Constant output torque throughout the entire variable speed range.
- * Positive displacement action ensures maximum 'controlability' at all speeds.
- * Carter Variable Speed Gears may be used to pick up loads from zero r.p.m.
- * Controls may be operated with the drive either running or stationary.
- * Made in ten sizes for fractional up to forty horsepower drives.
- * Flange mounted reduction gears can be supplied for slow speed drives.
- * Entirely self lubricating since oil is the power transmitting medium.

**'F' TYPE
CARTER
GEAR.**



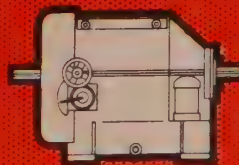
'F' Type Carter Variable Speed Gears. 1/4 h.p. up to 3 h.p. Handwheel, Hydraulic Relay, Lever or Remote Electrical Controls.

**'A' TYPE
CARTER
GEAR.**



'A' Type Carter Variable Speed Gears. 1 1/2 h.p. up to 21 1/2 h.p. Handwheel, Remote Electrical or Drilled Lever Controls.

**'AL' TYPE
CARTER
GEAR.**



'AL' Type Carter Variable Speed Gear. 40 h.p. Available with either Handwheel or Remote Electrical Controls.

To obtain copies of both Enquiry Forms and current technical publications please quote reference 1759.

Carter Gears Limited

BRADFORD 3 YORKSHIRE ENGLAND
'phone: Bradford 64378 (3 lines). 'grams: 'Became' Bradford Telex

LUMITRON



LUMITRON

Bring the Italian Influence In Fluorescents

The magnificence of Italian design has been most evident in many fields recently; not least in that of fluorescent light fittings. Now LUMITRON working in close collaboration with the foremost of the Italian Masters, can proudly announce the creation of their new range of fittings—remarkably distinctive for quality and matchless in economy.

Full details of these exciting developments can be received by requesting a copy of the LUMITRON "Italian Fluorescent" catalogue.

LUMITRON LTD.

Lighting Fittings Manufacturers
180 Shaftesbury Avenue
London, W.C.2
Telephone: Covent Garden 0126/7



TERMINAL BLOCKS



Full ranges
up to 12-way
From 5 amp.
to 50 amp.

Litholite
Plastic Moulders
since 1901

LITHOLITE Insulators & St. Albans MOULDINGS LTD.
Sandown Road, WATFORD, Herts. Tel. WATFORD 23377

The **APPELBE** "BULB FIXER"

NO LADDERS REQUIRED

Telescopic appliance for fixing and removing electric bulbs. Any reasonable height can be reached.

Made of Aluminium and can be carried with ease on any cycle.

STANDARD MODEL

for 60 to 200 watt lamps at 16' 6" from ground. 6' 0" closed. 12' 0" extended. Weight 3lb. Cycle clips and Extension Tubing supplied.

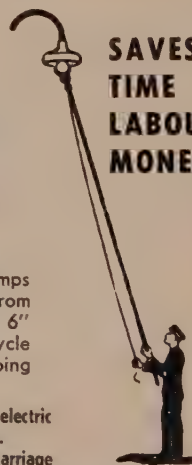
"A" MODEL

for 200 to 500 watt lamps E.S. Caps at 20' 0" from ground. 7' 0" closed. 16' 6" extended. Weight 5½ lb. Cycle clips and Extension Tubing supplied.

Used by the leading corporation and electric light companies throughout the world. Prices and particulars on request. Carriage Paid in Great Britain.



**SAVES
TIME
LABOUR
MONEY**



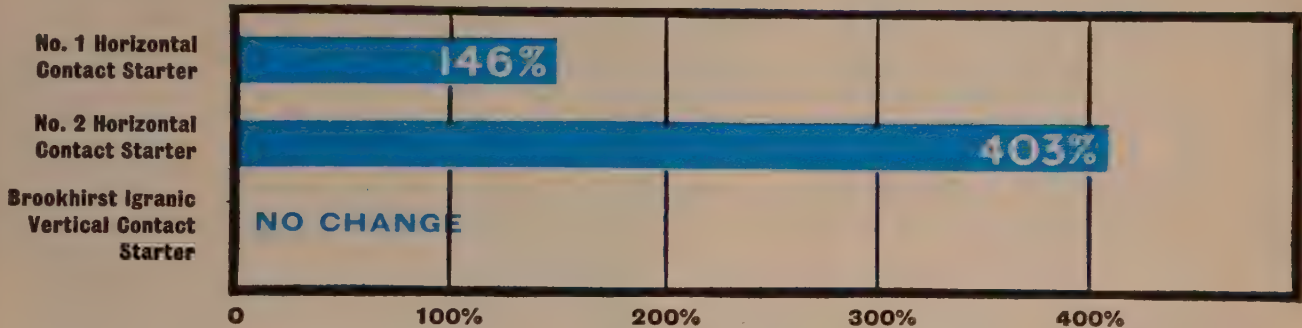
J. F. APPELBE & CO. LTD.
GREAT UNION STREET, HULL

Telephone 33522, 31212 and 8725. Telegraphic Address "Appelbeco, Hull"

By design... By test...

Vertical Contacts are *Dust Proof*

PERCENT GAIN IN CONTACT
RESISTANCE DUE TO DUST



A Brookhirst Igranitic motor starter with vertical contacts was tested in a standard dust chamber along with two starters with horizontal contacts.

The Brookhirst Igranitic vertical contact starter alone showed no increase in contact resistance due to dust deposits, because dust cannot collect on vertical surfaces. Increased contact resistance through dust leads to heating, pitting, wear, and failure.

Vertical DUST-SAFE contacts are Brookhirst Igranitic standard.



M
METAL INDUSTRIES GROUP

BROOKHIRST IGRANIC LIMITED

Sales Headquarters: BEDFORD WORKS • BEDFORD • Works at BEDFORD and CHESTER
Area Offices: Belfast, Birmingham, Bristol, Cardiff, East Anglia, Glasgow, Leeds, London, Manchester,
Mid-Southern, Newcastle, Nottingham, Sheffield.

Maker of Britain's widest range of electrical control and associated equipment.



Partly because the cat kept grumbling about not having enough room, and partly because even with our experience of packing high capacity into small space, we were bursting out of the place ourselves. So if you want to get in touch with SUFLEX about capacitors (and no doubt you will!) make a note of the new address. P.S. Now the damn cat is moaning because there are no mice — !

SUFLEX
LIMITED

SUFLEX ARE ON THE MOVE

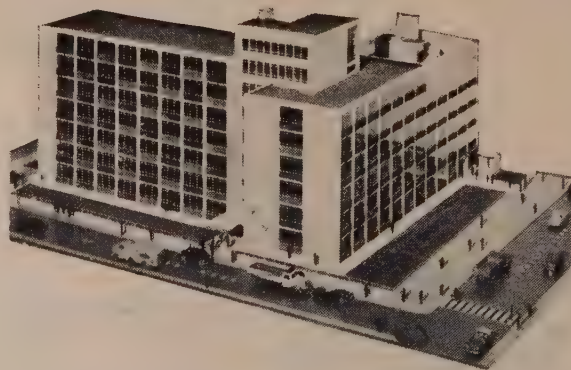
to
THEIR NEW HEADQUARTERS
at

**BILTON HOUSE,
54-58 UXBRIDGE ROAD,
LONDON, W.5**

Telephone : EALING 7733

Telegrams : SUFLEX . LONDON . WS

Cables : SUFLEX . LONDON



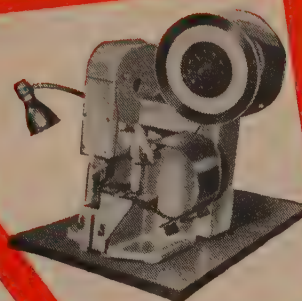
Factories at
RISCA, MONS. and PERIVALE, MIDDX.

A·E·I-HOTPOINT

use ***AMP**
solderless wiring devices

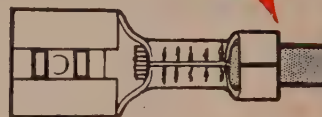


(Photograph by courtesy of
A.E.I.—Hotpoint Ltd.)



the means...

Application of *Faston terminals to
refrigerator harness



*Faston Terminal

The Hotpoint E.37 Iced Diamond
(3.7 cu. ft.) Refrigerator.

...to the end

QUICKER APPLICATION

RELIABLE PERFORMANCE

M-O'S AND A-R-B APPROVED

HIGH ELECTRICAL AND MECHANICAL STABILITY

WRITE NOW ABOUT THE **CREATIVE** APPROACH TO BETTER WIRING
AIRCRAFT-MARINE PRODUCTS (GT. BRITAIN) LTD.

Head Office: Dept. 7, AMPLO HOUSE, 87/89 SAFFRON HILL, LONDON, E.C.1
Tel: CHAncery 2902 (7 lines) Cables: AMPLO LONDON TELEX. Telex. 23513
Works: Scottish Industrial Estate, Port Glasgow, Scotland

SOUTH AFRICA: DISTRIBUTOR: E. S. MOWAT & SONS (PTY) LTD. 51-57, MILNE STREET, P.O. BOX 437, DURBAN, NATAL, SOUTH AFRICA
AUSTRALIA: MANUFACTURING COMPANY: AIRCRAFT-MARINE PRODUCTS (AUSTRALIA) PTY. LTD. BOX 78 P.O. AUBURN, N.S.W. AUSTRALIA
DISTRIBUTOR: GREENDALE ENGINEERING AND CABLES PTY. LTD. 43-51 NELSON STREET, ANNANDALE, N.S.W. AUSTRALIA
ASSOCIATED COMPANIES IN: U.S.A., CANADA, HOLLAND, FRANCE, GERMANY, ITALY, JAPAN AND PUERTO RICO



*Trade Mark of
AMP Incorporated, U.S.A.

VEHICLE FLUORESCENT LIGHTING

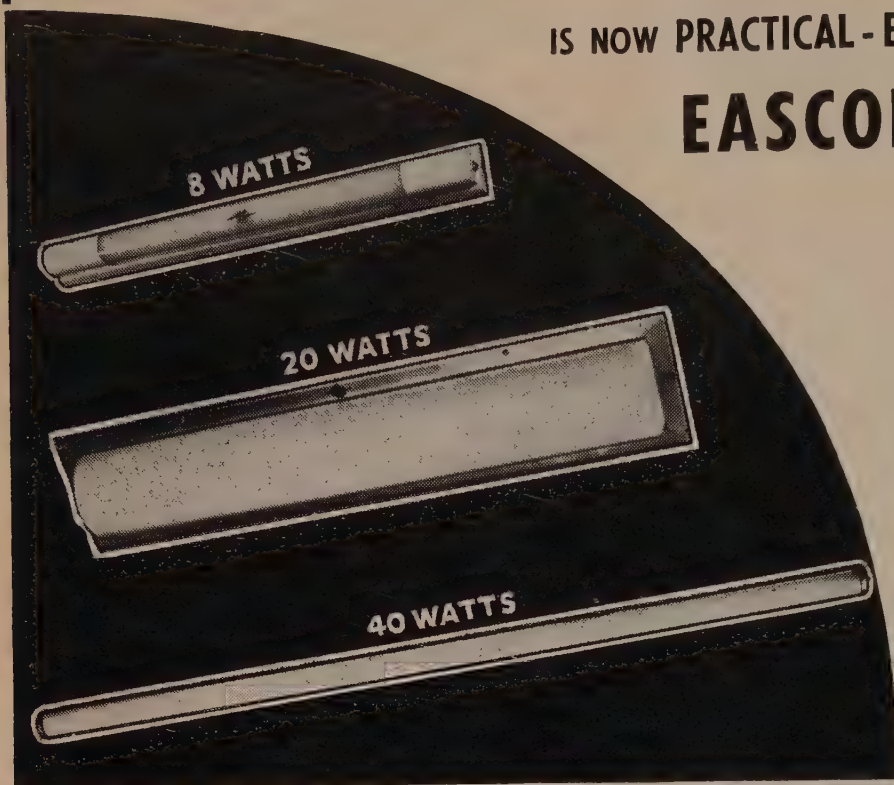
IS NOW PRACTICAL - ECONOMICAL - RELIABLE

EASCOLYTE TRANSISTOR CONTROL UNITS

OPERATING STANDARD FLUORESCENT TUBES FROM 12" 8 WATTS TO 4FT 40 WATTS NOW MAKE THE MOST EFFICIENT MEANS OF INTERIOR ILLUMINATION AVAILABLE TO THE MOTOR INDUSTRY



Full details from:-
Dept. E.R.
EASCO ELECTRICAL (HOLDINGS) LIMITED
Brighton Terrace, London, S.W.9
Phone: Brixton 4961 (3 lines)



PORCELAIN INSULATORS

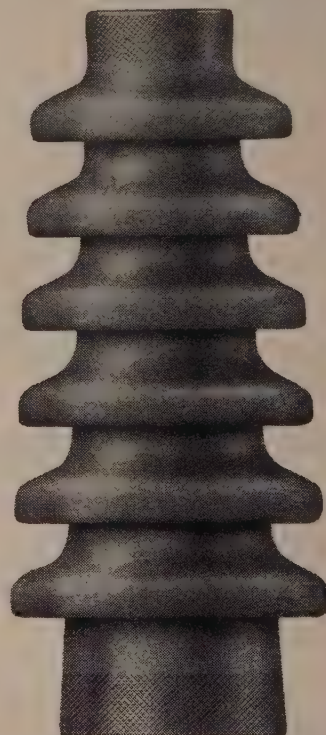
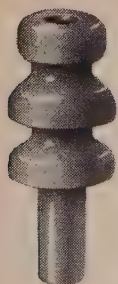
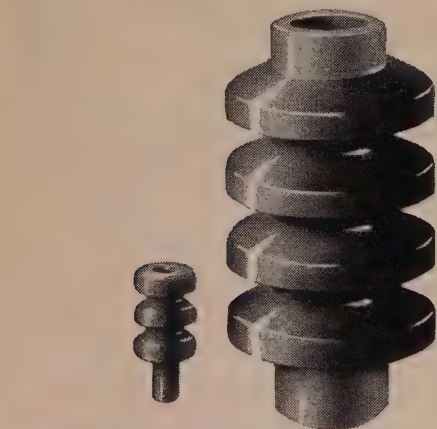
Insulators for...
HIGH TENSION
LOW TENSION
REFRACTORIES
and Special Ceramics

Manufactured by

JAMES MACINTYRE & CO., LTD.

WATERLOO ROAD BURSLEM

PHONE STOKE ON TRENT 87938



it's a fact

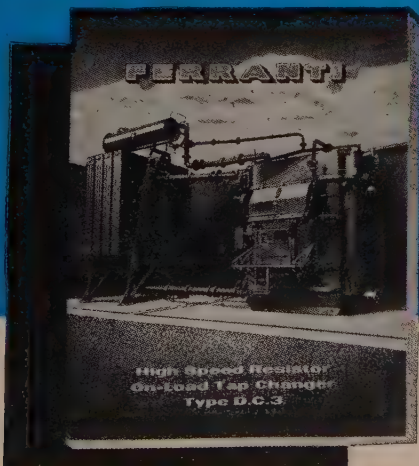
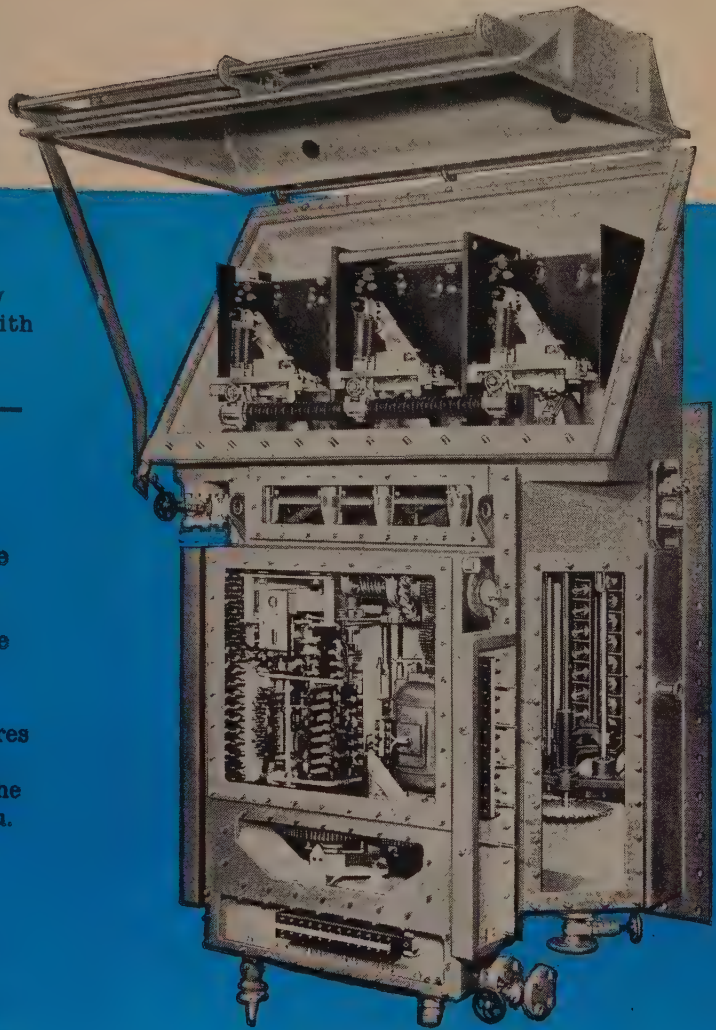
more than 200,000 operations with
D.C.3.

200,000 is a pretty impressive figure by any standard, but when it is linked with the number of operations carried out on the Ferranti D.C.3 Tap Changer using the same set of arcing contacts—and this is a proven test, not an estimate of performance—it is an achievement which will readily be appreciated by supply engineers.

The tap changer performed an average of 380 operations per hour at a rating equal to full load on a 10 MVA 33 kV System Transformer, running over the whole range step by step in both directions.

There are many other excellent features in D.C.3 that are worth knowing and our experts will be delighted to have the opportunity of explaining them to you. Please write for a copy of the D.C.3 Brochure which presents the equipment in the fullest detail.

FERRANTI
High Speed Resistor
On-Load Tap Changer
Type D.C.3



Ferranti

FERRANTI LTD • HOLLINWOOD • LANCs Tel: FALLsworth 2000
LONDON OFFICE: KERN HOUSE • 36 KINGSWAY • W.C.2. Tel: TEMple Bar 6668



They'll be standing on heads!

That's what will happen when you stock Sigma. Eager customers, falling over themselves to get a look at the new luxury Sigma refrigerator.

National Advertising tells them . . .

Sigma has top-level luxury,
Sigma has low-level prices!

Features to please your customers . . .

Giant size 'deep-freeze' compartments on all models to keep frozen food and ice cream fresh for weeks . . . 'Wonder-crisp' vegetable and salad drawers . . . Butter and cheese keepers . . . Adjustable space in the storage door for bottles of all shapes and sizes. Any kitchen decor can be matched instantly with the sliding removable plastic working top.

SEE Sigma STOCK Sigma Sigma SELLS ON SIGHT!

SIGMA—A famous name. From one of Europe's leading manufacturers with over half a century of experience of refrigeration.



Prices to please YOU and your customers

4 cu. ft. Luxury table top model	63 gns.
5 cu. ft. De-luxe table top model	69 gns.
5.8 cu. ft. Super Cabinet model	81 gns.

Special introductory offer!

4.8 cu. ft. cabinet model	59 gns.
made to sell at	85 gns.

A nation-wide service guarantee . . .

Dealers are freed from servicing worries with the Sigma guarantee. Arranged with Home Maintenance Ltd., customers receive service in the home. Guarantee covers refrigeration unit, 5 years — all other components 12 months. Plinth can be supplied on castors as optional extra.



Lister Blackstone
ER6 engine driving
a 200 kW L.D.C.
alternator at the
new joint boiler
house of Bristol
Royal Infirmary and
Bristol University.



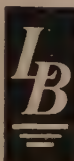
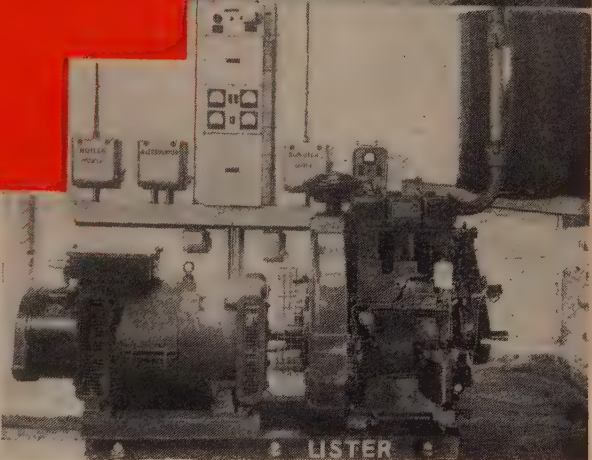
in an emergency ...

LISTER BLACKSTONE

provides the power



16 kW 415/240 V
HA3 Mains failure
plant at Papworth
Sanatorium, Cambs.



BLACKSTONE & CO LTD

A member of the Lister Group of Companies

DURSLEY, GLOUCESTERSHIRE. Phone 2378. Telex 43-230

London Office: Imperial House, Kingsway, W.C.2.
Phone: TEMple Bar 9681

Precision

ALL
AUTOMATIC
AND
CAPSTAN
TURNED
PRODUCTS

STOCKS
of standard
turned screws
available for
immediate use

TURNED FASTENERS

FOR THE ELECTRICAL AND ALLIED TRADES

Rapid assembly methods require precision fasteners and components.

Modern equipment, progressive technique, and quality
gauging provide an unsurpassed
specialist service.



VERNIER

MANUFACTURING CO. LTD.

15-19 Garman Road, London, N.17

Telephone: Tottenham 5077

it's NEW

The Contemporary

1000

range

★ A NEW CONCEPTION IN LAMP-
HOLDER STYLING — DESIGNED
FOR CONTEMPORARY DECOR

Smooth — Streamlined — Designed! In black,
white and dove grey. Stout brass barrels for
greater strength in new, heat-resisting materials,
to conform to the recent B.S.52 supplement No. 1.

*Selected by the Council of Industrial Design for display at the
Design Centre. Prize winning exhibit at the 1959 A.S.E.E. Exhibition*

**NOW
MADE
IN
NEW
HEAT-
RESISTING
MATERIALS**

*it's NETTLE**Write Now for Details***NETTLE ACCESSORIES LTD.**

Reg. Design Nos. 888492-4

SALES DIVISION — WARREN ST. STOCKPORT, CHES.

Member of the Aerialite Group of Companies

LW 6875



for
**MICANITE
COIL SLOT
INSULATION**

Consult

EAST LONDON MICA WORKS

RINGWOOD RD., WALTHAMSTOW, LONDON, E17

ESTD. 1912

Phone: COPpermill 2248/9

Telegrams: Elmicmer, Easphone, London

A MODERN MINIATURE

In attractive cases of contemporary design for flush panel mounting, these modern miniature Moving Coil and Moving Iron Ammeters and Voltmeters are compact, robust and possess the same high performance characteristics as larger "Cirscale" instruments. $3\frac{1}{4}$ in. square bezel, $2\frac{1}{8}$ in. diameter body fits standard K class fixing hole.

RECORD
"CIRSCALE"

SERIES B

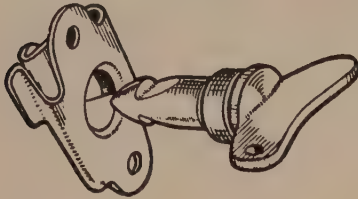
Offices at: Belfast, Birmingham, Bristol,
Dublin, Glasgow, Leeds, London.

THE RECORD ELECTRICAL CO. LIMITED

"Cirscale Works", Broadheath,
Altrincham, Cheshire.



ODDIE | FASTENERS



The Fastener with endless applications.
Simple, Positive, Self-locking. Made
in a variety of types and sizes.

Special Fasteners to suit customers' requirements

**WIDELY USED IN THE ELECTRICAL AND
RADIO INDUSTRY**

Department "E.R."

**ODDIE, BRADBURY & CULL LTD.
SOUTHAMPTON**

Telephone 55883

Cables: "Fasteners, Southampton"

DISTRIBUTION & POWER

TRANSFORMERS

& CHOKES

Insist on

TEC

3 KVA - 100 KVA

25 VA - 2 KVA

UP TO 100 KVA.

1 KVA - 100 KVA

ELASH TESTER

250 VA - 2 KVA.

15-200 V A.

60 VA - 10 VA

AIR & OIL COOLED TYPES
Good Deliveries
Clean Design & Finish
Competitive Prices.

The TRANSFORMER & ELECTRICAL CO LTD
MANUFACTURERS OF POWER TRANSFORMERS UP TO 100 K.V.A etc.
HONYWOOD RD., BASILDON, ESSEX.
C.S.A. Approved - Catalogue on Request - Contractors to H.M. Government
TELEPHONE: BASILDON 20491 - 3

for confidence in cables

look ahead with **LEAD**

... and there is nothing to equal the
LEAD acid battery for reliability and economy

The technical officers of the Association are always
glad to give individual assistance.

LEAD DEVELOPMENT ASSOCIATION, 18 Adam Street, London, W.C.2
Telephone: WHIttehall 4175 Telegrams: *Leadevep, Rand, London*

If you need

a small **METAL PRESSING** for your
product, why not consult us?

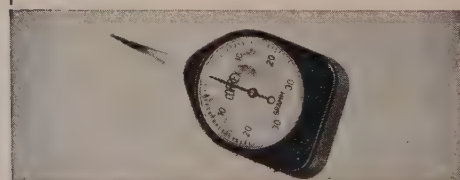
We specialise in light precision presswork
in all metals for the Electrical Trades.

QUOTATIONS BY RETURN

BIRMINGHAM SPECIALITIES LTD.
80-81 Bath Street, Birmingham 4. Phone: Central 2492

RELAY USERS "CORREX" TENSION GAUGES

The only instrument solely designed for accurately measuring tension on
Relays, Contacts, Switchgear, and electrical apparatus of all kinds.



Gauge measures
in grammes, and
a large range
of sizes is pro-
duced to cover
from 0.3-2,000
grammes.
Swiss made and
guaranteed.

Write for illustrations and prices from the Sole Distributors throughout the U.K.

JAMES W. CARR & CO. LTD.

Dept. SALES, 7-15, Rosebery Avenue, LONDON, E.C.1
Telephone: TERMINUS 8866 (P.B.X.)

GOLDEN PROSPECTS

"You'll strike it rich, pardner!"



with the **Parnall Spinwasher**

THE NEW COMPACT...SHEERLINE

ONE-TUB WASHER...RINSER...SPINDRYER

Soon the goldrush for the new Parnall Spinwasher will be here for you. So now's the time to reserve *your* share of profit offered by this

superbly designed washer. Full national advertising support—T.V., Press, Point of Sale. So take full advantage of this golden opportunity.

BE SURE TO STAKE YOUR CLAIM — BY ORDERING NOW!



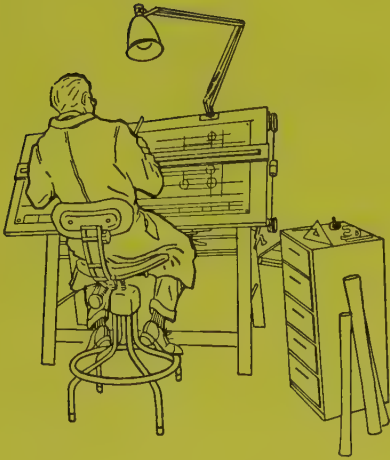
Spinwasher 75 gns tax paid

WITH HEATER 79 GNS. TAX PAID

ELECTRICAL DIVISION OF **Radiation** LTD 255 NORTH CIRCULAR ROAD NW10



Simplex



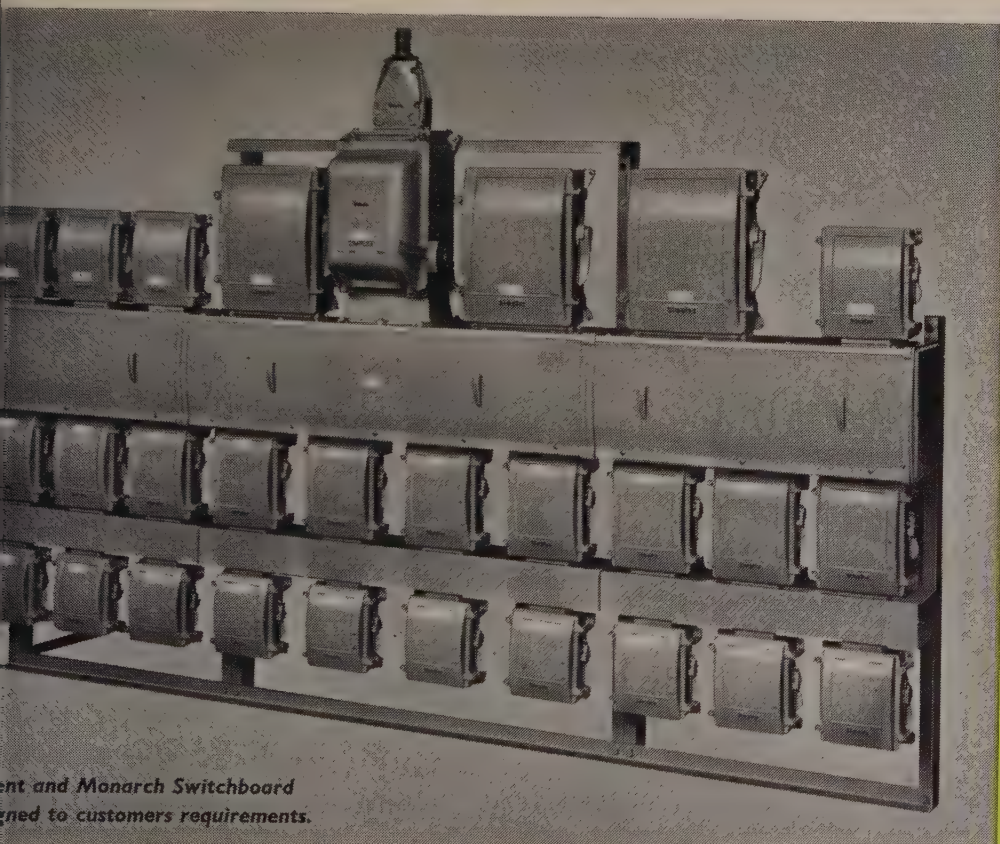
Simplex Switchboards are versatile. They can be assembled with Simplex Star, Regent and Monarch ranges, and with the Simplex S & S automatic control gear, also circuit-breakers, etc., etc. Simplex planning is geared to to-morrow's needs.

Simplex design service is at your disposal – always. From a simple assembly to the most complicated made-to-measure task. Simplex application and layout engineers can provide an ideal Switchboard for every industrial & commercial requirement.

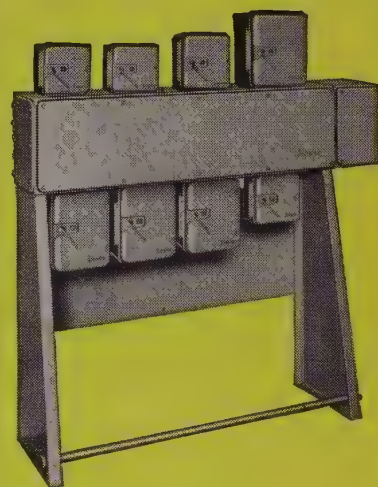


Switchboards

supplied with the brilliant new low-priced Simplex Star range, or the Simplex Regent and Monarch ranges of Switchgear, or the Simplex S & S automatic control gear, etc.



Regent and Monarch Switchboard designed to customers requirements.



Typical Simplex Star Switchboard. Send for the descriptive booklet on this brilliant new range.

A  COMPANY

Simplex

SIMPLEX ELECTRIC COMPANY LIMITED

BLYTHE BRIDGE, Nr. STOKE-ON-TRENT, STAFFS.

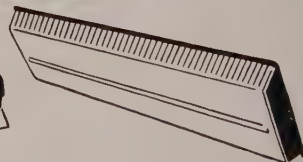
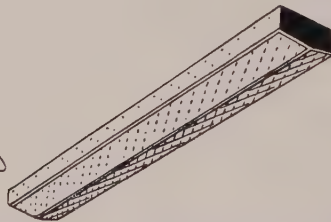
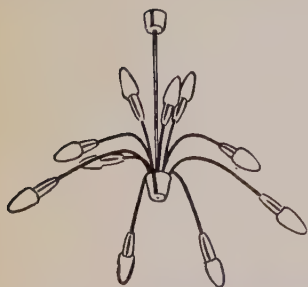
Branches throughout Great Britain and Agents throughout the World.



**all commercial
and industrial
installations
stores, shops
offices, banks
restaurants, factories**

The lighting of a store needs a different approach to the lighting of a factory. In fact every installation needs individual treatment to achieve the right effect. The Lighting Specialists offer their comprehensive service to interpret your lighting requirements and suggest the best possible scheme.

We are at your service from the supplying of a single fitting to the suggesting of a major lighting scheme.



COURTNEY, POPE

THE LIGHTING SPECIALISTS

COURTNEY, POPE (ELECTRICAL) LTD.
AMHURST PARK WORKS · Tottenham London N.15
Telephone: STAmford Hill 1270 (fifteen lines)

BRANCHES

10 Chatham Street, Manchester, 1. (Central 1837)
254A Corporation Street, Birmingham, 4. (Central 5852)
17 Wellington Street, Leeds, 1. (Leeds 3-4549)

Why more families choose Electrolux

More families choose Electrolux than any other make of refrigerator. Why? Because there's over 30 years experience in the way the Electrolux is designed.

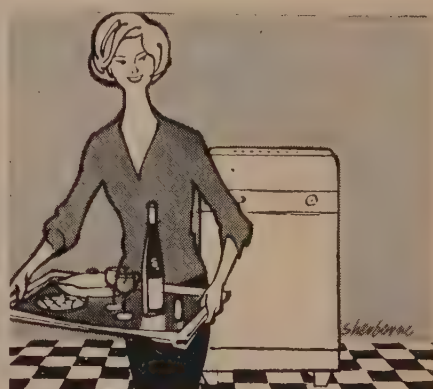
Because there's proven reliability and solid value behind the remarkably low price. In the L.26, you have a superb Electrolux refrigerator for only £47.17.5.



Space and Grace The 5½ sq. ft. shelf area with reversible shelf for tall bottles gives room and to spare for all the family needs. The L.26 is skilfully designed for small kitchens with big ideas!



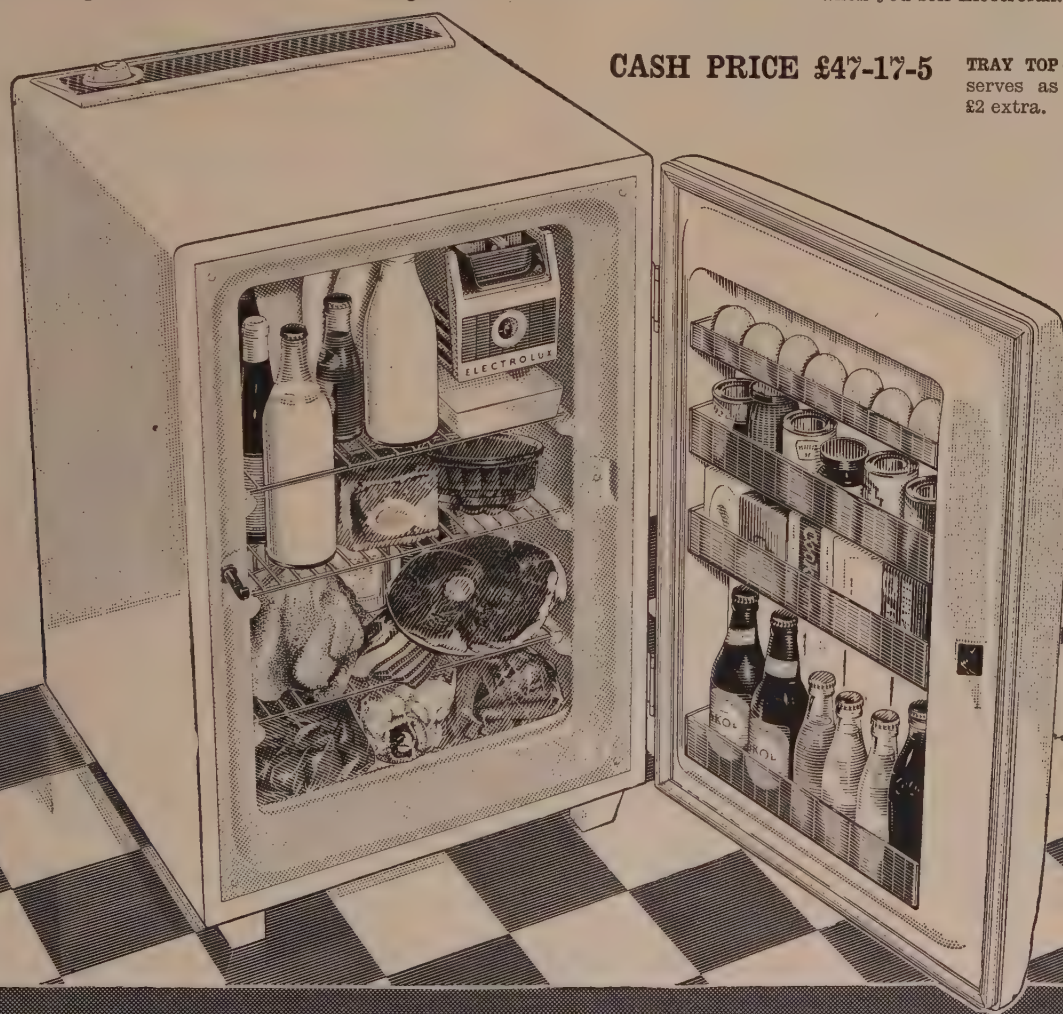
Lasting Value Every penny spent comes back in lasting value — Electrolux reliability is famous. Cooling unit guaranteed 5 years. Permanently silent operation by electricity or gas.



Skill and Experience From the feather-light, shut-at-a-touch door catch to the superb design and 'finish' of the cabinet you reap the rewards of over 30 years experience when you sell Electrolux.

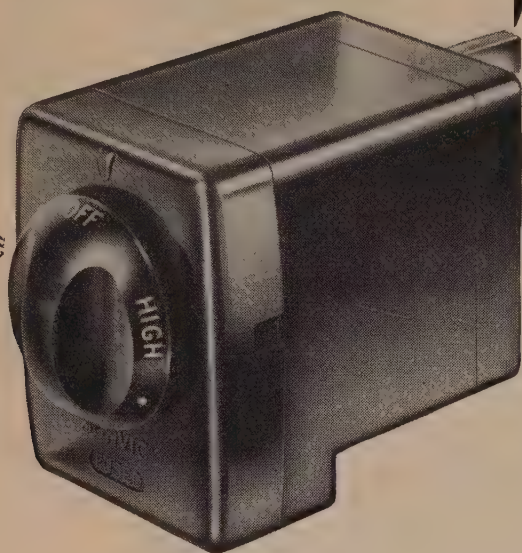
CASH PRICE £47-17-5

TRAY TOP — the tray that serves as a working top £2 extra.



Electrolux excels

this is
happening
everywhere!



Special
offer!

Initial orders for 12 and
more will be supplied in this
attractive display carton

Yes, everywhere people are buying a "Reguplug"! Housewives, householders, handymen—they are all pleased with this good idea which Sunvic call the "Reguplug". When customers see the "Reguplug" displayed—they buy! For here at last is a handy little device for controlling heat output of numerous electrical appliances. The "Reguplug" enables people, quite simply, to regulate an appliance to give just the heat required. Saves switching on and off—saves electricity! Ideal for heated carpet underlay, airing and drying cabinets, percolators, kettles, electric blankets, soldering irons, glue pots, heating platens, urns, wash boilers, sterilising equipment, and any electrical heating appliance.

Retail Prices

REGUPLUG

15 amp round pin ... 35/-

REGUPLUG

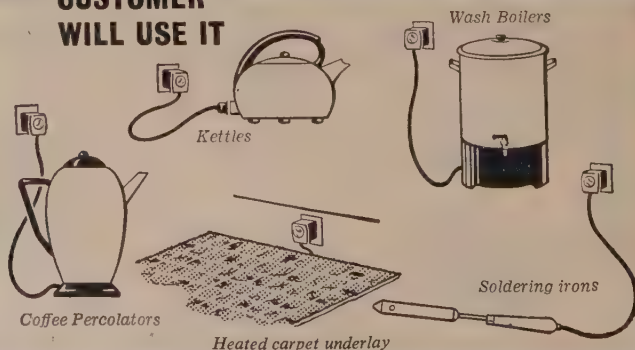
13 amp
flat pin (fused) ... 37/6

WHAT IS THE "REGUPLUG"?

The "Reguplug" is the "Simmerstat" designed to fit directly into a three-pin socket. It provides any piece of electrical heating apparatus with continuously variable control from off to full. Definite dwells are provided in the OFF and HIGH positions. Moulding is of high quality bakelite, white or brown. Silver contacts. For 13 amp and 15 amp circuits, 230/240V A.C., complying with BSS 1363 and BSS 546 respectively.



HOW YOUR CUSTOMER WILL USE IT



The Sunvic "Reguplug" is a product of:

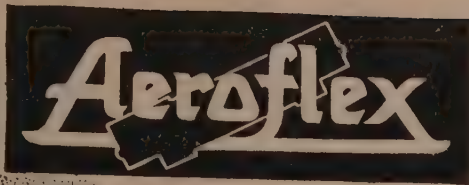


Instrumentation Division

P.O. Box 1 Harlow Essex

Harlow 25271

Associated Electrical Industries Limited



LINE FUSES

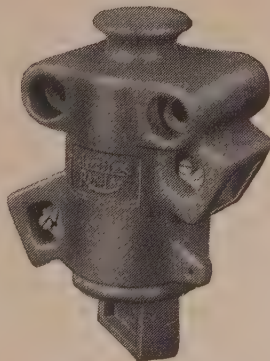
The two types of Line Fuses, differing only in connection, meet a steady demand, for instance, in the protection of pole-mounted transformers.

Incorporating Aeroflex AD and FC type rewirable cartridge fuse-links, they have the characteristics necessary to provide discriminatory reaction to faults; e.g. priority can be given to consumers' fuses on house service cut-outs.

The subject is fully dealt with in our publication No. AL2.

OVERHEAD LINE FUSES

The illustration shows examples from a considerable range of overhead line fuses to suit different situations:—on the left an Aeroflex 60 amp. Rotaloc line fuse is shown, suitable for securing to the cross bar of a line support, and having an adaptable fuse handle carrying an Aeroflex high breaking capacity 60 amp. ADS type rewirable cartridge fuse-link. The right hand illustration shows a 200 amp. porcelain enclosed line fuse, embodying Link Type handle with Aeroflex Ceram high breaking capacity rewirable cartridge fuse-link.



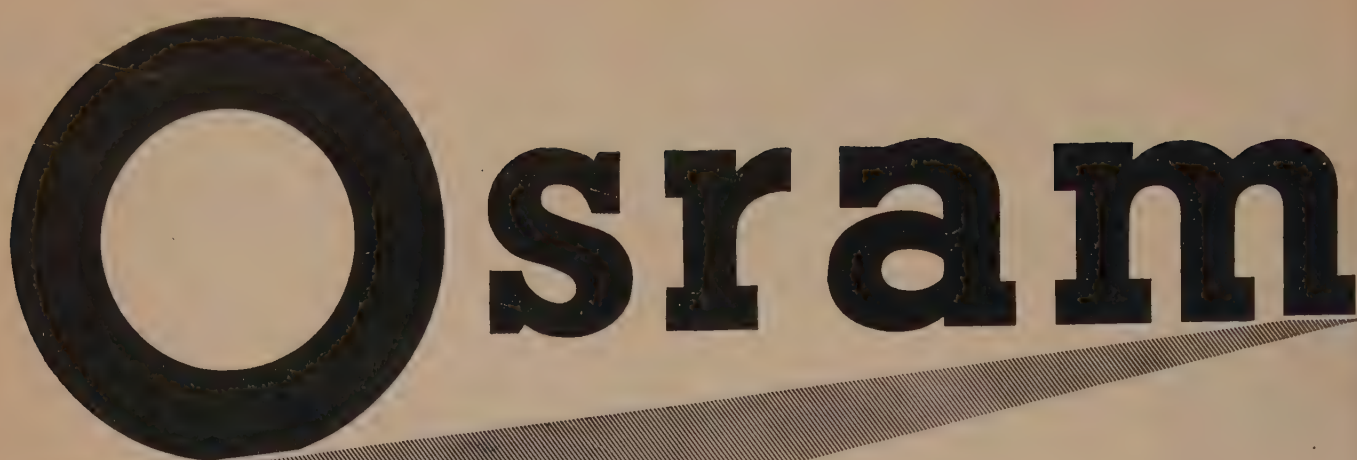
Parmiter Hope & Sugden Ltd.

FLUENT ELECTRICAL WORKS • LONGSIGHT • MANCHESTER 12

London: 24 Victoria Street, S.W.1.

Glasgow: 5 Somerset Place, C.3.

Birmingham: 39/41 Carrs Lane, 4.



COILED-COIL LAMPS ARE **NOW REDUCED*** TO SINGLE COIL PRICES

* EFFECTIVE MAY 3, 1960

PEARL AND CLEAR 200-260V

WATTS	OLD PRICES		NEW PRICES	
	List price	P. Tax	List price	P. Tax
40	1s 3½d	2½d	1s 2½d	2½d
60	1s 3½d	2½d	1s 2½d	2½d
75	1s 11d	4d	1s 10d	4d
100	1s 6d	3d	1s 5d	3d

OSRAM LAMP DIVISION, G.E.C., Magnet House, Kingsway, London WC 2

Classified Advertisements

CLASSIFIED advertisements are PREPAID at 3/6 per line (approx. 6 words).

DISPLAYED CLASSIFIED:—48/- per single column inch.

Where an advertisement includes a Box Number there is an additional charge of 1/-.

SERIES DISCOUNTS for consecutive insertions:—13, 5%; 26, 10%; 52, 15%.

SITUATIONS WANTED:—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

Cheques and Postal Orders should be crossed and made payable to ELECTRICAL REVIEW PUBLICATIONS LTD.

REPLIES TO BOX NUMBERS should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1. If an applicant for a situation appearing under a Box Number does not wish his reply to be forwarded to a particular firm or individual instructions to this effect should be addressed to the Advertisement Supervisor, ELECTRICAL REVIEW. The name of an advertiser using a Box Number cannot be disclosed.

OFFICIAL NOTICES, TENDERS, ETC.

THE COQUET WATER BOARD

Filtration Works and Pumping Station,
Warkworth: Contract No. 12

TENDERS are invited for the supply, delivery and erection at the site at Warkworth of all or any of the following SWITCHBOARDS AND TRANSFORMERS which are required to control and distribute the electricity supplies at the above station.

- (i) No. 1 Switchboard (13 panels) for distribution of 3,300 volts, 3-phase, 50 cycles per second supplies and comprising incoming and transformer circuit breakers, automatic contactor motor starter and bus section switch.
- (ii) Two (2) 400-kVA, 3,300/415-240-volt, 3-phase transformers.
- (iii) No. 2 Switchboard (23 panels) for distribution of 415-volt, 3-phase, and 240-volt, single-phase supplies and comprising incoming circuit breakers, automatic contactor motor starters, bus section switch, switch-fuse and distribution fusegear.
- (iv) No. 3 Switchboard (9 panels) for further distribution of 415-volt, 3-phase, and 240-volt, single-phase supplies and comprising incoming circuit breakers, automatic contactor motor starter, switch-fuse and distribution fusegear.
- (v) No. 4 Switchboard (5 panels) for further distribution of 415-volt, 3-phase, and 240-volt, single-phase supplies and comprising incoming circuit breakers, automatic contactor motor starters, switch-fuse and distribution fusegear.

Specifications may be obtained on application to Mr. S. G. Barrett, M.I.C.E., Engineer and Manager, The Coquet Water Board, P.O. Box 104, Pilgrim Street, Newcastle upon Tyne, 1.

Tenders to be returned in the envelope provided to the undersigned not later than 10 a.m. on the 13th June, 1960. The Board do not bind themselves to accept the lowest or any tender and reserve the right to accept the whole or part of any tender received.

F. G. EGNER,

Clerk and Solicitor
to the Board.

14, Northumberland Square,
North Shields.

4278

BOROUGH OF ELLESMERE PORT

Contract No. 298

33 Group "A" Electric Street Lamps:
Chester/Birkenhead Trunk Road A.41

TENDERS are invited for the provision and erection of 33 Concrete Group "A" Electric Street Lamps complete on the above road.

Contract documents obtainable from the Borough Engineer and Surveyor, Queen Street, Ellesmere Port, on the 5th May, 1960.

Sealed tenders, in the plain official envelope provided, must reach the undersigned by post by not later than 5 p.m. on Thursday, the 19th May, 1960. The Council do not bind themselves to accept the lowest or any tender.

R. J. BERNIE,

Town Clerk.

Municipal Offices,
Ellesmere Port, Cheshire.
25th April, 1960.

4329

URBAN DISTRICT COUNCIL OF COULSDON AND PURLEY

New Group "A" Sodium Lighting in

- (a) High Street, Purley
- (b) Godstone Road (part of), Purley and Kenley
- (c) Marlpit Lane, Coulsdon
- (d) Smithambottom Lane, Purley
- (e) Woodcote Grove Road, Coulsdon
- (f) Woodcote Road, Purley

TENDERS are invited for the provision and erection of 215 Stanton Concrete Lighting Columns and the provision and fixing of 140-watt Sodium Lamps and G.E.C. Lanterns on the above roads, and the removal of the existing street lighting equipment.

Specification, bills of quantities and forms of tender, prepared by H. M. Collins, Engineer and Surveyor, may be obtained upon receipt of a deposit of £4 4s., which will be refunded upon receipt of a bona fide tender and the return of documents supplied.

Plans and conditions of contract may be inspected at the office of the Engineer and Surveyor.

Sealed tenders in the envelope provided to be submitted by not later than first post on 24th May, 1960.

The Council do not bind themselves to accept the lowest or any tender.

Council Offices,
Purley, Surrey.

ERIC F. J. FELIX,

Clerk of the Council.

4331

COUNTY BOROUGH OF IPSWICH

Improved Street Lighting, 1960/1961

TENDERS are invited for the erection of approximately 110 Group "A" Steel and Concrete Street Lighting Columns and the provision and erection of a similar quantity of 140-watt and 85-watt Sodium Discharge Lanterns, with lamps and control gear. The contract will include the provision only of a further quantity of approximately 10 Sodium Discharge Lanterns with the control gear housed within the canopy.

Specification and bill of quantities may be obtained, and conditions of contract and layout drawings inspected, at the office of the Borough Engineer and Surveyor, 19, Tower Street, on payment of £1 is. deposit, which will be returned on receipt of a bona fide tender not subsequently withdrawn.

Tenders in plain sealed envelopes bearing the words "Improved Street Lighting, 1960/61," but with no name or mark to indicate the sender, must be received by the undersigned not later than noon on 23rd May, 1960.

The Council does not bind itself to accept the lowest or any tender.

J. C. NELSON,

Town Hall,
Ipswich.

Town Clerk.

4330

COUNTY COUNCIL OF DURHAM

TENDERS are invited for supplying Electric Lamps and miscellaneous appliances for year ending 31st August, 1961.

Forms of tender, returnable by 20th May, 1960, from undersigned.

G. H. METCALFE,

Director of Education.

Shire Hall, Durham.
25th April, 1960.

4286

Advertisements are accepted up to first post on Monday of the week of issue

If displayed with boxed rules, name or symbol block by Friday prior to week of issue

All communications to be addressed to:
Classified Advertisement Department,
ELECTRICAL REVIEW
Dorset House, Stamford Street
London, S.E.1

Original testimonials should not be sent with applications for employment

COUNTY BOROUGH OF SOUTHEND-ON-SEA

Proposed Electrical Installation at
Hinguar Primary School

TENDERS are invited for the performance of works in connection with the proposed Electrical Installation at Hinguar Primary School.

General conditions of contract and drawings may be inspected and copies of form of tender, specification and drawings obtained on application to the Borough Architect, 30, Alexandra Street, Southend-on-Sea.

Sealed tenders addressed to the undersigned and endorsed "Proposed Electrical Installation, Hinguar Primary School," are to be delivered to this office before 3 p.m. on Friday, 27th May, 1960, and no tender received thereafter will be considered.

No tender will be received except in the special envelope provided, which shall not bear any name or mark indicating the sender.

The Corporation do not bind themselves to accept the lowest or any tender.

ARCHIBALD GLEN, Town Clerk.

4327

COUNTY BOROUGH OF SOUTHEND-ON-SEA

Proposed Electrical Installation at
Fairfax High School for Boys

TENDERS are invited for the performance of works in connection with the proposed Electrical Installation at Fairfax High School for Boys.

General conditions of contract and drawings may be inspected and copies of form of tender, specification and drawings obtained on application to the Borough Architect, 30, Alexandra Street, Southend-on-Sea.

Sealed tenders addressed to the undersigned and endorsed "Proposed Electrical Installation, Fairfax High School for Boys," are to be delivered to this office before 3 p.m. on Monday, 23rd May, 1960, and no tender received thereafter will be considered.

No tender will be received except in the special envelope provided, which shall not bear any name or mark indicating the sender.

The Corporation do not bind themselves to accept the lowest or any tender.

ARCHIBALD GLEN, Town Clerk.

4328

SITUATIONS VACANT

See "Replies to Box Numbers" above

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

APPLICATIONS are invited for the post of SENIOR COMMERCIAL ASSISTANT (Consumers' Adviser) at Perth. Candidates should possess wide experience in commercial matters, particularly in regard to dealing with local authorities and with consumers' problems on tariffs, connection terms and conditions of supply. A good knowledge of the electricity supply industry is essential.

Salary commencing at a point within the range £885-£1,055 (N.J.C. Grade 5/6), depending on experience and qualifications. Superannuation scheme.

Application forms, obtainable from the Area Manager, Blackfriars, Perth, should be returned by 18th May, 1960.

4340

Situations Vacant (continued)**CENTRAL ELECTRICITY
GENERATING BOARD****East Midlands Division**

APPPLICATIONS are invited for the following positions within the Division:—

**ASSISTANT SHIFT CHARGE
ENGINEER, WILLINGTON "A"
POWER STATION**
(Vacancy No. 94/60).

Applicants should have received a sound technical training and have had experience in a modern power station.

Preference will be given to candidates who possess the Higher National Certificate or its equivalent.

Salary will be in accordance with Class L, Grade 8 (£1,195-£1,270 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications, 13th May, 1960.

**ASSISTANT SHIFT CHARGE
ENGINEER, BURTON-ON-TRENT
POWER STATION**
(Vacancy No. 95/60).

Applicants should possess H.N.C. or equivalent qualifications and have experience in power station operation.

Salary will be in accordance with Class E, Grade 9 (£765-£810 per annum) of the National Joint Board Agreement, plus £90 per annum shift allowance.

Closing date for receipt of applications, 13th May, 1960.

SENIOR DRAUGHTSMAN
(Civil Engineering and Building),
**TRANSMISSION DEPT.,
DIVISIONAL HEADQUARTERS**
(Vacancy No. 96/60).

Applicants for this appointment should have suitable technical training and be thoroughly conversant with the design and detailing for civil and building works, including steel and R.C. structures and foundations. The work is associated with H.V. substations and generating stations.

Salary will be in accordance with Grade 4 of Schedule D of the National Joint Board Agreement and will be within the range £930-£1,030 per annum.

Closing date for receipt of applications, 13th May, 1960.

**FOURTH ASSISTANT ENGINEER,
TRANSMISSION DEPARTMENT,
DIVISIONAL HEADQUARTERS**
(Vacancy No. 99/60).

Experience in maintenance and operation of 132-kV transmission lines and substations essential.

Candidates should preferably have qualifications leading to Corporate Membership of the Institution of Electrical Engineers.

The salary will be in accordance with Class AX/EX, Grade 7 (£840-£1,065 per annum) of Schedule B of the National Joint Board Agreement.

Closing date for receipt of applications, 20th May, 1960.

**ASSISTANT RESIDENT ENGINEER,
TRANSMISSION DEPARTMENT,
DIVISIONAL HEADQUARTERS**
(Vacancy No. 102/60).

Applications are invited for the post of Assistant Resident Engineer for Headquarters Schemes within the Division.

Candidates should have had experience in all phases of construction of transmission lines having steel towers and S.C.A. conductors, and have a knowledge of their design. They should preferably possess H.N.C. electrical or mechanical qualifications.

The salary will be in accordance with Class AX/EX, Grade 6 (£925-£1,170 per annum) of Schedule B of the National Joint Board Agreement.

Closing date for receipt of applications, 20th May, 1960.

These appointments will be pensionable within the terms and conditions of the Electricity Supply (Staff) Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Divisional Establishments Officer, Central Electricity Generating Board, East Midlands Division, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated.

O. S. WOODS,
Divisional Controller.

28th April, 1960.

4335

NEW ZEALAND MINISTRY OF WORKS

**The New Zealand Government Ministry of Works invites
applications for Permanent Staff appointments. Positions
available are:—**

CIVIL ENGINEERS

Qualifications: Corporate Membership of the Institution of Civil Engineers, London. Commencing salaries from £955-£1,525 p.a.

ASSISTANT CIVIL ENGINEERS

Qualifications: A University Degree in Civil Engineering which gives exemption from Final Parts I and II of the A.M.I.C.E. examination; or other qualifications exempting from Parts I and II of A.M.I.C.E. plus at least 5 years' appropriate experience. Commencing salaries from £870-£1,060 p.a.

**MECHANICAL AND
ELECTRICAL ENGINEERS
(AND ASSISTANTS)**

Qualifications: Corporate Membership of the Institutions of Mechanical or Electrical Engineers, London, or for Assistants a University Degree in Mechanical or Electrical Engineering or Graduate Membership of the above Institutions. Commencing salaries, depending on experience, for Engineers £955-£1,525 per annum and for Assistants up to £1,060 per annum.

**BUILDING SERVICES
ENGINEERS (AND ASSISTANTS)**

Qualifications: Corporate Membership of the Institution of Mechanical Engineers or of the Institution of Heating and Ventilating Engineers, London, or for Assistants a University Degree in Mechanical Engineering or Graduate Membership of the above Institutions. Commencing salaries, depending on experience, for Engineers £955-£1,525 per annum and for Assistants up to £1,060 p.a.

Enquiries, mentioning this publication, quoting reference number B11/30/22 and indicating the position sought, should be addressed to the High Commissioner for New Zealand, 415, Strand, London, W.C.2. Full details of housing available, fares payable, career prospects, type of work, terms of contract, local conditions and application forms will then be supplied.

**DRAUGHTSMEN—
CIVIL AND STRUCTURAL**

Qualifications: Ordinary or Higher National Certificates or the final examination of the City and Guilds, London, or Associate Membership of the Institution of Structural Engineers are desirable, but primary requirement is for skilled and speedy draughtsmen with substantial experience at the drawing board and in the types of civil engineering work designed by the Ministry of Works. Commencing salary up to £1,060 per annum.

**DRAUGHTSMEN—
MECHANICAL, ELECTRICAL
AND BUILDING SERVICES**

Qualifications: Ordinary or Higher National Certificate in Mechanical or Electrical Engineering or equivalent examination, and at least 3 years' experience in draughting, design and calculations. Commencing salaries up to £1,060 per annum.

**QUANTITY SURVEYORS AND
ASSISTANT QUANTITY SURVEYORS**

Qualifications: Quantity Surveyors must be Associates of the Royal Institute of Chartered Surveyors or the Quantity Surveyors' Institute. Assistant Quantity Surveyors should have passed the intermediate sections of those examinations.

For both positions experience is required in the measuring and pricing of the building and allied trades, in final accounts and adjustment of contracts.

Commencing salaries up to £1,285 for Quantity Surveyors and up to £1,060 for Assistants.

WELDING INSPECTING ENGINEER

APPPLICATIONS are invited for the position of WELDING INSPECTING ENGINEER.

Candidates should have ample practical experience in shop welding to Class I and II standards and should hold a City and Guilds Certificate of Welding, together with Higher National Certificate in Mechanical Engineering or Metallurgy, or equivalent qualifications.

The person appointed will be required to advise on welding procedure and testing and to report upon welding work in progress both in manufacturers' works and in the field. Previous experience of similar work would be an advantage.

Salary in accordance with qualifications and experience.

Staff bonus and pension schemes.

Applications giving full details of age, qualifications and experience, within fourteen days, to:—

PREECE, CARDEW & RIDER
8, 10 & 12, Queen Anne's Gate
Westminster, London, S.W.1

4305



VACANCIES exist for **TECHNICAL/
COMMERCIAL ENGINEERS** to prepare schemes, tenders and handle contracts involving a wide range of electrical equipment. Personality is important, as the work involves direct contact with customers.

Minimum qualification H.N.C. or equivalent.

Age preferably not more than 30.

Applications will be treated in strict confidence.

Write with details of age, qualifications, experience and present salary to:—

**Divisional Commercial Manager
Motor & Control Gear Division
ASSOCIATED ELECTRICAL
INDUSTRIES LIMITED**

Rugby

4308

NO FUTURE IN YOUR PRESENT POSITION?

WE are a medium-sized virile company with a forty-year reputation for electrical control equipment presenting unique opportunities to forward-looking men joining our Research Development and Production teams. A new expansion programme calls for suitably qualified staff to exploit an interesting range of applications, from guided missile work to industrial automation. We offer secure, pensionable, progressive posts and the chance to BE SOMEBODY with a company quick to recognise and reward ability.

YOU are invited to apply for the following positions if you have the qualifications required coupled with a forceful outlook on today's technical problems and developments.

PHYSICIST

for the special study of semi-conductors and rotating mechanisms as applied to motor control equipment. Graduate or equivalent qualifications.

DESIGN ENGINEERS

PLANNING ENGINEERS

CONTROL GEAR ENGINEERS

All the above are required for development of our motor control gear programme. Qualifications—H.N.C. or equivalent practical experience.

APPLICATION ENGINEERS

CONTRACTS ENGINEERS

ELECTRONIC ENGINEERS

for the application of semi-conductors to Automation. H.N.C. or equivalent practical experience.

TIME & MOTION STUDY ENGINEER

O.N.C. or equivalent.

ENGINEERING ESTIMATORS

O.N.C. or equivalent.

DETAIL DRAUGHTSMEN

DESIGN DRAUGHTSMEN

CIRCUIT DETAIL DRAUGHTSMEN

O.N.C. or equivalent practical experience.

Contact Mr. Bridle, Personnel Officer, for full details in strictest confidence.

DEWHURST & Partner Limited

Inverness Road, HOUNSLOW, Middx.

Tel.: Hounslow 0083 (12 lines)

239

POWER STATION CHEMIST ELECTRICITY DEPARTMENT CAPE TOWN, SOUTH AFRICA

A VACANCY exists in the Generation Branch of the Electricity Department of the City Council of Cape Town, South Africa, for a suitably qualified person for the position of POWER STATION CHEMIST.

The scale of pay (total emoluments) applicable to the post is £1,560 with two increments of £60 to a maximum of £1,680 per annum.

Applicants must possess a degree in Chemistry of a recognised university or an equivalent qualification. They must have had experience in a power station laboratory and be familiar with the methods of sampling and analysis of materials used in a power station, preferably with advanced steam conditions. A knowledge of nuclear physics and the use of radio-active isotopes will be an advantage.

Persons possessing the requisite qualifications and experience are invited to apply not later than MONDAY, 23rd MAY, 1960, and to address their applications to:—

Messrs. Merz and McLellan
Carloli House
Newcastle upon Tyne
England

from whom further particulars relating to the vacant position may be obtained. 4287

AUTOMATIC MACHINE TOOL CONTROL

A YOUNG Electrical Engineer required by progressive machine tool company for their expanding electrical engineering department handling automation and prototype development programme. The position has good prospects for a graduate I.E.E. or equivalent, preferably with electrical manufacturing training and a keen interest in development work.

Five-day week, canteen, social club and pension scheme.

Applications in confidence, giving age, qualifications and experience to the Electrical Engineer, The Churchill Machine Tool Co. Ltd., Broadheath, Altrincham, Cheshire. 4288

CENTRAL ELECTRICITY GENERATING BOARD

South Wales Division

Revised Advertisement

Vacancy No. 105/ER/60

APPLICATIONS invited for superannuable N.J.B. appointment of DRAUGHTSMAN in the CONSTRUCTION UNIT of the GENERATION DEPARTMENT at DIVISIONAL HEADQUARTERS.

Salary D.3, £1,055-£1,155 per annum, or D.4, £930-£1,030 per annum, according to qualifications and experience.

Applicants should be suitably qualified and have experience in civil engineering and building works for H.V. substations, including design and detailing of reinforced concrete foundations, piling, road and drainage schemes.

The work will necessitate visits to sites within the Division for preparation of scheme extensions.

Previous applicants need not re-apply.

Special application forms obtainable from Secretary, South Wales Division, Central Electricity Generating Board, Twyn-y-fedwen Road, Gabalfa, Cardiff, to be returned by 20th May, 1960. 4302

HUDDERSFIELD COLLEGE OF TECHNOLOGY

Principal: Dr. W. E. Scott, M.B.E.

APPLICATIONS are invited for the post of HEAD of the DEPARTMENT OF ELECTRICAL ENGINEERING. Candidates should possess a good degree, should have had experience in industry, and should preferably be Corporate Members of the Institution of Electrical Engineers.

Salary Burnham Scale, Grade II, £1,600 p.a. by £50 p.a. to £1,800 p.a.

Application forms and further particulars obtainable from the Principal, to whom applications should be returned as soon as possible.

H. GRAY,

Clerk to the Governors.

22nd April, 1960.

4289

ELECTRICAL ENGINEER

A FIRST-class Electrical Engineer, 30/35 years of age, is required by a firm of Mechanical and Electrical Services Consulting Engineers with offices in London and the North of England engaged on designing, preparing specifications and drawings and supervising contractors' work on mechanical and electrical services for factories, shipyards, hospitals, municipal and university buildings, technical colleges, schools and swimming baths. Applicants should be Corporate Members of the Institution of Electrical Engineers, and the holding of an electrical engineering degree would be an advantage though not essential.

A good salary, commensurate with the qualifications of the successful applicant, will be offered. A superannuation scheme is operated by the firm and a five-day week is worked. The successful applicant should be prepared to live in the North of England.

Apply by letter marked "Confidential," giving full details including age, education, qualifications, experience and present salary, to the Senior Partner.—Box 4313.

NORTH EASTERN ELECTRICITY BOARD

Area Board Headquarters,
Newcastle upon Tyne, 1

Vacancy for Assistant Chief Accountant

APPLICATIONS are invited for the post of ASSISTANT CHIEF ACCOUNTANT in the Chief Accountant's Department. The successful applicant will be responsible for the capital expenditure records of the Board, taxation, preparation of financing and other returns, etc. The possession of a recognised accountancy qualification is essential.

The salary will be in accordance with the N.J.M. Class B, Grade 7 (£2,160-£2,360), and the post is superannuable.

Applications, marked "Confidential," to be received by the Secretary, North Eastern Electricity Board, Carloli House, Newcastle upon Tyne, 1, not later than 16th May, 1960.

J. E. HAYES,

Secretary. 4279

Situations Vacant (continued)**SOUTHERN ELECTRICITY BOARD****Senior Assistant Engineer (Planning and Development) (Z.1202)**

Sub-Area Engineering Department of No. 1 (Southall) Sub-Area, located at Waterloo Road, Uxbridge. Salary N.J.B. Class M, Grade 2 (£2,080-£2,200 per annum, inclusive of London allowance). N.J.B. conditions of service.

Candidates must be able to organise a department carrying out planning of distribution networks up to and including 66 kV, and preferably should have had general experience in the supply industry, including maintenance and operation.

Second Assistant Engineer (Maintenance and Operation) (Z.1201)

Sub-Area Engineering Department of No. 1 (Southall) Sub-Area, located at Waterloo Road, Uxbridge. Salary N.J.B. Class M, Grade 7 (£1,410-£1,500 per annum, inclusive of London allowance). N.J.B. conditions of service.

The duties of the post will be to assist in the maintenance and operation of switchgear, transformers, cables and overhead lines up to and including 66 kV. The appointment will involve standby duties.

Assistant Engineer (Maintenance and Operation) (Z.1197)

Heston District of No. 1 (Southall) Sub-Area. Salary N.J.B. Class G, Grade 9 (£910-£955 per annum, inclusive of London allowance). N.J.B. conditions of service.

The duties of the post will be to assist with the maintenance and operation of switchgear, transformers, auxiliary gear and underground cables up to and including 11 kV. The appointment will involve standby duties.

Assistant Engineer (Maintenance and Operation) (Z.1199)

Staines District of No. 1 (Southall) Sub-Area. Salary N.J.B. Class G, Grade 9 (£910-£955 per annum, inclusive of London allowance). N.J.B. conditions of service.

The duties of the post will be to assist with the maintenance and operation of switchgear, transformers, auxiliary gear and underground cables up to and including 11 kV. The appointment will involve standby duties.

Assistant Engineer (Maintenance and Operation) (Z.1200)

Maidenhead District of No. 1 (Southall) Sub-Area. Salary N.J.B. Class G, Grade 9 (£860-£905 per annum). N.J.B. conditions of service.

The duties of the post will be to assist with the maintenance and operation of switchgear, transformers, auxiliary gear and underground cables up to and including 11 kV. The appointment will involve standby duties.

Applications for the above appointments on forms obtainable from the Sub-Area Secretary, 2/6, Windmill Lane, Southall, Middlesex, and returned to him, quoting the appropriate "Z" number, not later than 16th May, 1960.

Assistant Engineer (Maintenance and Operation) (Z.1192)

Oxford District of No. 2 (Newbury) Sub-Area. Salary N.J.B. Class J, Grade 11 (£860-£905 per annum). N.J.B. conditions of service.

The duties of the post will be to assist with the maintenance and operation of H.V. and L.V. distribution mains and substations and with minor construction work. A technical training to H.N.C. standard and experience of similar work are required.

Applications on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury, Berks, and returned to him, quoting Z.1192, not later than 16th May, 1960.

Assistant Engineer (Maintenance and Operation) (Z.1191)

Swindon District of No. 2 (Newbury) Sub-Area. Salary N.J.B. Class F, Grade 9 (£815-£860 per annum), with N.J.B. conditions of service, but present trends indicate that the District may be reclassified to Class G with effect from 1st April, 1960.

The duties of the post will be to assist with the maintenance and operation of H.V. and L.V. distribution mains and substations and with minor construction work. A technical training to H.N.C. standard and experience of similar work are required.

Applications on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury,

Berks, and returned to him, quoting Z.1024, not later than 16th May, 1960.

Assistant Engineer (Maintenance and Operation) (Z.1024)

Staines District of No. 1 (Southall) Sub-Area. Salary N.J.B. Class G, Grade 12 (£750-£795 per annum, inclusive of London allowance). N.J.B. conditions of service.

The duties of the post will be to assist with the maintenance and operation of switchgear, transformers, auxiliary gear and underground cables up to and including 11 kV. The appointment will involve standby duties.

Applications on forms obtainable from the Sub-Area Secretary, 2/6, Windmill Lane, Southall, Middlesex, and returned to him, quoting Z.1198, not later than 16th May, 1960.

Demonstrator (Z.1195)

Maidenhead District of No. 1 (Southall) Sub-Area. Salary N.J.C. Grade 1 (£525-£625 per annum). N.J.C. conditions of service.

Applicants should be qualified to advise generally on the utilisation of electric domestic appliances, to give public demonstrations of apparatus and to assist in showroom duties. The possession of an E.A.W. Certificate or equivalent domestic science qualification would be an advantage.

Applications on forms obtainable from the Sub-Area Secretary, 2/6, Windmill Lane, Southall, Middlesex, and returned to him, quoting Z.1195, not later than 16th May, 1960.

The successful candidates for the above appointments will be required to contribute to the Electricity Supply (Staff) Superannuation Scheme, if eligible. 4365

SURREY COUNTY COUNCIL

APPPLICATIONS invited for appointment of **ASSISTANT ELECTRICAL ENGINEERS** in the salary range of £785-£1,220 p.a. plus £30 p.a. London allowance.

Commencing salary will be in accordance with qualifications and experience.

Full details, present salary and three copy testimonials to County Architect, County Hall, Kingston-on-Thames, as soon as possible. 4256

CENTRAL ELECTRICITY GENERATING BOARD**South Eastern Division****Northfleet District**

A **FOURTH ASSISTANT ENGINEER** (Communications) (Vacancy No. 94/60) is required in the Electrical Engineer's Department based at Northfleet Power Station.

Duties will include maintenance of automatic telephone and V.H.F. radio equipment. Applicants should have had training and experience with the G.P.O. or with a manufacturer preferably specialising in radio or electronics, and should possess H.N.C. or its equivalent.

Salary N.J.B. Schedule B, AX/DX, Grade 7, £890-£1,090, including London allowance.

Applications giving age, details of training, experience, present salary, etc., should be sent to the Personnel Officer, Central Electricity House, Lower Ham Road, Kingston-upon-Thames, Surrey, to arrive by 27th May, 1960.

W. H. DUNKLEY,
Divisional Controller.

4301

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

INSTALLATION INSPECTION ENGINEER required in the Liverpool South District. Salary will be £910/£955 per annum (N.J.B. H/9).

Applicants should have had considerable experience in the testing and inspection of all types of domestic, commercial and industrial installations, and have knowledge of the regulations covering these installations. Experience in the installing and connecting of single-phase and polyphase metering equipment is required. Candidates should possess suitable technical qualifications.

Appointment subject to medical examination. Pension scheme.

Application forms, available from the Manager, No. 1 Sub-Area, 24, Hatton Garden, Liverpool, 3, should be completed and returned not later than 17th May, 1960. 4306

ENGINEER

is required at the new

CULHAM LABORATORY

of the

UNITED KINGDOM ATOMIC ENERGY AUTHORITY**Nr. Abingdon, Berkshire**

He will be responsible for a workshop organisation associated with the Intermediate Current Stability Experiment (I.C.S.E.) and possibly other thermonuclear research devices to be built at Culham. Duties will include the provision of a service to the Experiment for erection, modification and maintenance of the Major Experimental Plant and High Voltage Power Supplies and for workshop service to the associated smaller laboratories.

Initially he will be required to specify the workshop facilities and equipment—machine tools, test gear, stores, etc., and undertake recruiting and training of personnel.

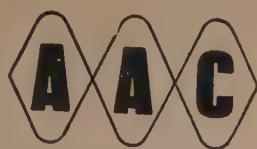
The appointment will be in the engineering class at a salary range of £1,370-£1,825 p.a. according to experience and age.

Applicants should be corporate members of one of the senior engineering institutions and have had experience in mechanical and electrical engineering. They should have a mature and practical outlook and a lively interest in Scientific Research.

Housing and superannuation schemes.

Send POSTCARD for application form to the Group Recruitment Officer (1659/48), U.K.A.E.A., A.E.R.E., Harwell, Didcot, Berks.

4276



ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LIMITED

ELECTRICAL ENGINEER SALISBURY, SOUTHERN RHODESIA

APPlicants are invited for the position of Electrical Engineer in the Corporation's office at Salisbury, Southern Rhodesia.

Applicants should possess a B.Sc. degree in Heavy Current Electrical Engineering and have at least six years' postgraduate experience in this branch of engineering. Knowledge of mining plant, electrical equipment and distribution systems including low and medium voltage switchgear and protective apparatus is required, but applicants with adequate experience of industrial installations will also be considered. Knowledge of thermal generating plant would be a recommendation.

Salary will be in accordance with qualifications and experience. Applications in writing should be addressed by Air Mail to:—

The Personnel Officer (Salisbury)
P.O. Box 1108
Salisbury
Southern Rhodesia

giving details of academic qualifications and practical experience, together with an indication of the degree of responsibility held.

4277

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT DISTRICT ENGINEER, Crawley and Horsham District.

Salary within the range £860-£905 under N.J.B. Class F, Grade 8. Applicants should be suitably qualified and have had training and experience in the construction, operation and maintenance of underground and overhead distribution systems up to 11 kV. The successful applicant will be required to reside within the district and undertake standby duties. Subject to certain conditions, housing accommodation may be available at Crawley.

Applications, quoting ER and naming two referees, to District Manager, SEEBOARD, 50/52, The Broadway, Crawley, by 18th May, 1960.

ASSISTANT ENGINEER (Operation and Maintenance), Croydon & West Kent Sub-Area.

Salary N.J.B. Class K, Grade 10, £1,015 × £20 to £1,075 per annum, including London allowance. Applicants should either be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualifications and should have had experience in the operation and maintenance of distribution systems up to and including 33 kV.

Applications, quoting ER and naming two referees, on forms from Croydon and West Kent Area Manager, SEEBOARD, Electric House, Wellesley Road, Croydon, by 18th May, 1960.

ASSISTANT DISTRICT ENGINEER, Weald District.

Salary £765 × £15 to £810 under N.J.B. Class E, Grade 9. Superannuable. The successful applicant will be required to assist in construction and maintenance of H.V. and L.V. overhead and underground mains and substations. Technical qualifications desirable.

Applications, quoting ER and naming two referees, to District Manager, SEEBOARD, Fairview, Highgate, Hawkhurst, Kent, by 18th May, 1960.

ASSISTANT DISTRICT ENGINEER, West Kent District.

Salary £1,015 × £20 to £1,075, including London allowance under N.J.B. Class G, Grade 7. Superannuable. Applicants, who should be suitably qualified, must have practical training and experience in general distributing work on systems up to 11 kV. Administrative experience and the ability to organise and execute a programme of work an advantage.

Applications, quoting ER and naming two referees, on forms from District Manager, SEEBOARD, 286, High Street, Orpington, Kent, by 18th May, 1960.

ASSISTANT DISTRICT ENGINEER, Hastings District.

Salary £815 × £15 to £860 under N.J.B. Class F, Grade 9. Preference to applicants with technical qualifications up to Higher National

Certificate standards and with practical experience of the operation, maintenance and construction of M.V. and 11 kV underground and overhead systems. The successful candidate will be expected to undertake standby duty and to reside in or near Hastings.

Applications, quoting ER and naming two referees, to District Manager, SEEBOARD, 12/13, York Buildings, Hastings, by 18th May, 1960.

ASSISTANT DISTRICT COMMERCIAL ENGINEER (Public Lighting), West Kent District.

Salary £805 × £15 to £850, including London allowance, under N.J.B. Class G, Grade 11. Superannuable. The successful applicant will be required to supervise the erection and maintenance of street lighting equipment, to prepare street lighting schemes, and negotiate agreements with Lighting Authorities.

Applications, quoting ER and naming two referees, on forms from District Manager, SEEBOARD, 286, High Street, Orpington, Kent, by 18th May, 1960.

SENIOR DEMONSTRATOR, Twickenham and Richmond District.

Salary £640 × £20 to £700 + £40 London weighting per annum under N.J.C. Grade 2. Superannuable. Applicants should have diploma or certificate in domestic science, also E.A.W. Certificate. Duties include lecturing, demonstrating, advising consumers, training junior demonstrators and generally assisting in any of the district's showrooms.

Applications, quoting ER and naming two referees, to District Manager, SEEBOARD, 42, York Street, Twickenham, Middlesex, by 18th May, 1960.

DISTRICT SENIOR COMMERCIAL ASSISTANT (Sales), Woking District.

Salary £980 × £25 to £1,055 per annum under N.J.C. Grade 6. Superannuable. The successful applicant will be responsible for the co-ordination of showrooms and stocking of major appliances, sales promotion, including the control of outside representatives and demonstrators, the direction of sales campaigns, exhibitions and publicity and other general commercial duties.

Applications, quoting ER and naming two referees, on forms from District Manager, SEEBOARD, 4, Chobham Road, Woking, by 23rd May, 1960.

ASSISTANT DISTRICT COMMERCIAL ENGINEER, Woking District.

Salary £910 - £955 per annum under N.J.B. Class F, Grade 7. Superannuable. The successful applicant will be responsible for the contracting and consumers' service department and must have experience in all aspects of elec-

trical installation and service work. Preference to applicants with Higher National Certificate.

Applications, quoting ER and naming two referees, on forms from District Manager, SEEBOARD, 4, Chobham Road, Woking, by 23rd May, 1960.

ELECTRICAL FITTER, Hastings District.

Wages 5s. 1½d. per hour for 42-hour, 5-day week under N.J.I.C. Agreement. The duties of the successful applicant will include the erection, connection and maintenance of switchgear and transformers throughout the district.

Applications, quoting ER and naming two referees, on forms from District Manager, SEEBOARD, 12/13, York Buildings, Hastings, by 16th May, 1960.

CARTOGRAPHIC DRAUGHTSMAN, Dorking and Epsom District.

Salary £640 × £20 to £700 per annum under N.J.C. Grade 2. Superannuable. Applicants should have experience in the preparation of mains record plans, reproduction of Ordnance Survey Maps and general drawing office routine.

Applications, quoting ER and naming two referees, on forms from District Manager, SEEBOARD, 56, South Street, Dorking, by 18th May, 1960.

GEORGE WRAY,
Secretary.

4367

SOUTH WALES ELECTRICITY BOARD

Supervisor, Central Typing Service

A SUPERVISOR is required to take charge of the Central Typing Service at the Mon. and Mid Wales Area Offices, Cwmbran. The Central Typing Service will cover the work of both the Mon. and Mid Wales Area and the East Mon. District.

The successful applicant will be responsible for staff supervision, for allocation of work, and for supervision of the dictation system, and will be required to assist in the normal work of the Central Typing Service.

The post is a new and responsible one and some experience of supervision of a typing service and use of dictating machines would be an advantage. Applicants should be qualified and experienced shorthand typists, capable of assisting with the training of junior typing staff.

The salary for the position will be in accordance with Grade 2 (£640-£700) of the National Joint Council (Administrative and Clerical Grades) Agreement for the Electricity Supply Industry.

Applications stating age, present position, present salary, qualifications and experience should be addressed to D. G. Gwyn, B.Sc., A.M.I.E.E., Manager, Mon. and Mid Wales Area, Albany Chambers, Skinner Street, Newport, Mon., so as to arrive not later than Saturday, 14th May, 1960.

Envelopes should be endorsed "Supervisor-90/60."

Senior Demonstrator and Demonstrators

Applications are invited for the following Demonstrator posts:—

(a) SENIOR DEMONSTRATOR, Swansea District.

Salary N.J.C. Grade 2 (£640-£700).

(b) DEMONSTRATOR, Neath District.

Salary N.J.C. Grade 1 (£525-£625).

(c) DEMONSTRATOR, Bridgend District.

Salary N.J.C. Grade 1 (£525-£625).

Candidates must be competent to give demonstrations and lectures in public halls, consumers' houses or showrooms on cooking, laundering or housecraft subjects. They should also have sales ability for showroom duties, and a good knowledge of electrical appliances.

The qualifications required are the diploma of a recognised domestic science college, or the Demonstrators' Certificate, and candidates should hold the E.A.W. Certificate.

The person appointed will be required to take part in the agreed rota of Saturday working.

Applications stating age, qualifications, experience and particulars of present duties should be addressed to the undersigned at St. Mellons, Cardiff, so as to arrive not later than Saturday, 21st May, 1960.

Envelopes should be marked:—

(a) Senior Demonstrator-8/60

(b) Demonstrator-87/60

(c) Demonstrator-89/60

R. G. WILLIAMS,
Secretary. 4368

Situations Vacant (continued)**EASTERN ELECTRICITY BOARD**

APPPLICATIONS are invited for the following appointments. The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Suffolk Sub-Area**APPOINTMENT OF MANAGER**
(92/60.R).

Following the appointment of Mr. P. Sydney as Manager, Chilterns Sub-Area, he is resigning from the post of Manager, Suffolk Sub-Area, and applications are invited from suitably qualified candidates to fill the resultant vacancy.

Salary in accordance with Grade 10, Class C of the National Joint Managerial Agreement (£2,980-£3,205).

Applications to reach the Secretary, Eastern Electricity Board, P.O. Box 40, Wherstead, Ipswich, Suffolk, by 13th May, 1960.

Fens Sub-Area**SUB-AREA HEADQUARTERS
ENGINEERING DRAUGHTSMAN**
(Building and Civil Engineering)
(93/60.R).

Civil Engineering Draughtsman for general steelwork and reinforced concrete structures. Some electrical knowledge would be an advantage. The successful applicant will be a member of a team making up layouts of 33,000-volt outdoor type substations.

Salary N.J.B. Schedule D, Grade 6 (£620-£740).

Apply by letter to the Secretarial Officer, Fens Sub-Area, Eastern Electricity Board, Milton Hall, Milton, Cambridge, by 20th May, 1960.

Norfolk Sub-Area**SUB-AREA HEADQUARTERS,
NORWICH
FOURTH ASSISTANT ENGINEER**
(Operation and Maintenance),
**SUB-AREA ENGINEERING
DEPARTMENT (94/60.R).**

Applications are invited for the post of Fourth Assistant Engineer in the Sub-Area Engineering Department. Applicants should have had a sound technical training and possess the Higher National Certificate or equivalent qualification. The main duties of this post will be concerned with telecommunications.

Salary N.J.B. Class K, Grade 12 (£860-£905).

Apply by letter to the Engineer, Norfolk Sub-Area, Eastern Electricity Board, 4, Duke Street, Norwich, Norfolk, by Friday, 13th May, 1960.

Northmet Sub-Area**SUB-AREA HEADQUARTERS,
LONDON, N.14
CIVIL ENGINEERING AND
BUILDING SECTION
TWO GENERAL ASSISTANT
ENGINEERS**

(Ref. 957) (96/60.R).

Candidates should have had a good general and technical education, possess a sound knowledge of practical building and civil engineering construction, and be capable of setting out and supervising site works.

Salary N.J.B. Grade 16 (£815-£860) plus London allowance.

**TWO ENGINEERING
DRAUGHTSMEN**
(Ref. 958) (95/60.R).

Candidates should have had a good technical training and experience in the preparation of plans and detailed drawings of building and civil engineering works including substations, service centres, workshops and offices. Possession of the O.N.C. (Building) or an equivalent qualification will be an advantage.

Salary N.J.B. Schedule D, Grade 6 (£620-£740) plus London allowance.

For these appointments apply by letter to the Manager, Eastern Electricity Board, Northmet Sub-Area, Northmet House, Southgate, London, N.14, by 16th May, 1960.

TOTTENHAM DISTRICT**THIRD ASSISTANT ENGINEER**
(Ref. 945) (97/60.R).

Candidates should have had a sound technical training and suitable experience in the construction, operation and maintenance of H.V. and L.V. distribution systems including substations.

Salary N.J.B. Class F, Grade 9 (£815-£860) plus London allowance.

Apply by letter to the Manager, Eastern Electricity Board, 312, High Road, Tottenham, London, N.15, by 16th May, 1960.

FOURTH ASSISTANT ENGINEERS

- (a) **NORWICH DISTRICT**
(98/60.R).
- (b) **HORNSEY DISTRICT**
(Ref. 950) (99/60.N).
- (c) **WOOD GREEN DISTRICT**
(Ref. 952) (100/60.R).

Candidates should have had a sound technical training and suitable experience in the construction, operation and maintenance of H.V. and L.V. distribution systems including substations.

Salaries: (a) and (b) N.J.B. Class G, Grade 11 (£765-£810); (c) N.J.B. Class F, Grade 11 (£710-£755) plus London allowance for posts (b) and (c).

It is anticipated that post (a) Norwich District will be reclassified to Class H from 1st April, 1960, in which case the scale would be £815-£860.

For these appointments apply by letter as follows:—

- (a) The Manager, Norwich District, Eastern Electricity Board, 4, Duke St., Norwich, Norfolk, by 20th May, 1960.
- (b) C. Bradley, M.I.E.E., Manager, Eastern Electricity Board, The Broadway, Crouch End, Hornsey, London, N.8, by 16th May, 1960.
- (c) R. A. Voit, M.I.E.E., Manager, Eastern Electricity Board, 13/27, Station Road, Wood Green, London, N.22, by 16th May, 1960.

4363

GHANA CIVIL SERVICE

APPPLICATIONS are invited for the post of **ELECTRICAL SUPERINTENDENT, PUBLIC WORK DEPARTMENT.**

Duties: Installation and maintenance of diesel-driven generating plant, both A.C. and D.C., to 400 h.p., the installation and maintenance of electric motors, both A.C. and D.C.; to instal switchgear and control gear and draw up specifications for materials; to calibrate and check all instruments and attend to safety precautions; to supervise and train subordinate staff in their respective duties.

Qualifications: Candidates must possess Higher National Certificate in Electrical Engineering or Final of the City and Guilds and have served an apprenticeship with a reputable firm of electrical engineers and hold a responsible position for at least 5 years. Knowledge and experience of automobile wiring, wiring of buildings and air conditioning plant an advantage.

Salary £1,040 - £1,280 p.a.

Appointment on contract terms for two tours each of 15-18 months. Gratuity £150 p.a. Free passages for officer, wife and up to 3 children under 18 years, and in addition an education allowance for children when not resident in Ghana and attending full-time school of £100 a child for up to 3 children under 18 years. Accommodation at low rental. Interest-free advance for car and car maintenance allowance may be granted. Generous leave on full pay. Income tax at low local rates.

For further particulars and application forms, please send POSTCARD stating post in which you are interested to the Director of Recruitment, Ghana High Commission (Recruitment Section), 248/50, Tottenham Court Road, London, W.1.

4356

**RELIANCE CORDS &
CABLES LTD.****SENIOR INSPECTORS**

for Cable Factory, London District, manufacturing rubber and plastic cable principally for the telecommunications industry, with possibilities of early promotion. Experience of Government inspection procedures preferable.

TECHNOLOGIST

with experience in the handling and testing of materials for the foregoing types of cable.

Apply in writing with particulars of previous experience to:—

Chief Engineer**RELIANCE CORDS & CABLES LTD.**

Fingal Works, Staffa Road
Leyton, London E.10

when arrangements for an interview will be made.

4354

**CENTRAL ELECTRICITY
GENERATING BOARD.****North Eastern and Yorkshire Region****Technical Department, Yorkshire Division**

APPPLICATIONS are invited for the following appointments in the Technical Department, Leeds:—

**FOURTH ASSISTANT
ENGINEER (Protection).**

Applicants should possess technical qualifications leading to Corporate Membership of the I.E.E. and have experience in the application or maintenance of control and protective equipments applied to high-voltage transmission and generating systems.

**FOURTH ASSISTANT
ENGINEER (Meters).**

Applicants should possess technical qualifications leading to Corporate Membership of the I.E.E. and have experience in the assembling and testing of electrical meters and instruments, preferably with summation equipment.

The salary for these appointments will be in accordance with the National Joint Board Agreement, Schedule B, Grade 8 (£735-£800 per annum).

**GENERAL ASSISTANT
ENGINEERS.**

Applicants should possess or be completing technical qualifications leading to Corporate Membership of the I.E.E. and have some knowledge of control and protective equipment applied to high-voltage transmission and generating systems.

The salary for these appointments will be in accordance with the National Joint Board Agreement, Schedule B, Grade 9 (£570-£725 per annum).

Forms of application may be obtained from the Assistant Regional Secretary (Personnel), Central Electricity Generating Board, North Eastern and Yorkshire Region, 1, Whitehall Road, Leeds, 1, to whom they should be returned to arrive not later than the 21st May, 1960.

4364

MORECAMBE ELECTRICAL EQUIPMENT COMPANY LIMITED**SENIOR CONTROL GEAR DESIGN
ENGINEER**

WE have a vacancy at Morecambe for an Engineer who is experienced in the design of components and accessories for Electric Motor Control Gear.

Experience of modern materials and manufacturing methods is essential, and the appointment carries with it the responsibility for the supervision of testing of prototype designs and completion of production drawings.

The salary would be commensurate with age and experience.

Please write with confidential details to the Technical Director.

WESTGATE WORKS, MORECAMBE, LANCASHIRE

4220

YORKSHIRE ELECTRICITY BOARD

No. 5 (Wakefield) Sub-Area
THIRD ASSISTANT ENGINEER
(Development).

Applicants must have had training and experience in the design of electric space heating. Experience in industrial process heating will be an advantage.

The duties will include the design of electric space heating installations.

The successful applicant will be required to visit and advise architects and industrialists throughout the Sub-Area in the furtherance of electrical load development.

Salary N.J.B. Class L, Grade 10, £1,025/£20/£1,085 per annum.

DONCASTER DISTRICT
THIRD ASSISTANT DISTRICT
ENGINEER.

Applicants should have had practical training and experience in the construction, operation and maintenance of H.V. and M.V. overhead and underground distribution networks, substation plant and ancillary equipment.

Candidates should preferably have attained the technical standard of the Higher National Certificate in Electrical Engineering, or hold equivalent qualifications.

Candidates must be prepared to reside in the district and undertake standby duties.

Salary N.J.B. Class G, Grade 9, £860/£15/£905 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a, Denby Dale Road, Wakefield, not later than 20th May, 1960.

No. 6 (Hull) Sub-Area
ASSISTANT INSTALLATION ENGINEER.

Applicants must have had a sound technical education and practical experience in electrical contracting work of all types. They must be capable of preparing and supervising schemes for all classes of domestic, commercial and industrial installations, including specifications, estimates and tenders. Applicants must have had experience in the control of workmen.

Preference will be given to applicants who have attained the technical standard of the Higher National Certificate in Electrical Engineering, or equivalent qualifications.

Salary N.J.B. Class K, Grade 13, £815/£15/£860 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Kingston-upon-Hull, not later than 20th May, 1960.

No. 7 (Grimsby) Sub-Area
GRIMSBY, SCUNTHORPE and
GAINSBOROUGH DISTRICTS
THIRD ASSISTANT ENGINEERS
(Installation).

Applicants should have practical experience in the supervision of the day to day work of Installation Inspectors and Electricians engaged on the servicing of consumers' apparatus and installations. An appropriate technical qualification will be an advantage.

Salaries:—

Grimsby and Scunthorpe Districts, N.J.B. Class G, Grade 10, £815/£15/£860 per annum.

Gainsborough District, N.J.B. Class E, Grade 10, £710/£15/£755 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than 20th May, 1960. 4369

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

1. Area Board Headquarters

(a) ONE SENIOR ASSISTANT, Secretary's Department, Estates and Wayleaves Section with location at Carloli House, Newcastle upon Tyne.

Duties will include acquisition of substation sites, service centres and other non-operation property. Applicants should have experience of urban estate work and be members of either the Royal Institution of Chartered Surveyors or Chartered Auctioneers' and Estate Agents' Institute.

Salary N.J.C. Grade 6 or 7, £980/£1,160 according to qualifications and experience. N.J.C. conditions of service.

2. Wear Sub-Area

(a) One SECOND ASSISTANT DISTRICT ENGINEER, South Shields District.

Applicants should have had a sound training and experience in the construction, operation and maintenance of H.V. and L.V. underground distribution networks, substation plant and auxiliary equipment. Knowledge of overhead line maintenance an advantage. Preference will be given to candidates with qualifications leading to Corporate Membership of I.E.E. Successful applicant will be required to reside in the District and undertake standby duties.

Salary N.J.B. Class F, Grade 7, £910/£955. N.J.B. conditions of service.

(b) One FOURTH ASSISTANT ENGINEER, Planning and Development Section with location at Sub-Area Headquarters, Sunderland.

Applicants must have had training and experience of the planning and design of underground and overhead H.V. and L.V. distribution systems and have the Higher National Certificate in Electrical Engineering or an equivalent qualification.

Salary N.J.B. Class L, Grade 13, £860/£905. N.J.B. conditions of service.

3. Tees Sub-Area

(a) One FOURTH ASSISTANT ENGINEER (Assistant Clerk of Works, Buildings), with location at Sub-Area Headquarters, Thornaby-on-Tees.

Duties include supervision of the construction and maintenance of the Board's property comprising substations, workshops, depots, service centres and offices. Applicants should be familiar with bills of quantities and able to set out, measure up and deal with interim and final accounts.

Salary N.J.B. Class L, Grade 13, £860/£905. N.J.B. conditions of service.

(b) Two THIRD ASSISTANT ENGINEERS, Planning and Development Section with location at Sub-Area Headquarters, Thornaby-on-Tees.

Applicants should have had a sound training and experience in H.V. and L.V. overhead and underground distribution. Duties will include load and voltage calculations, to assist in planning of new distribution networks and the preparation of system reinforcement schemes. Preference will be given to candidates with qualifications leading to Corporate Membership of I.E.E.

Salary N.J.B. Class L, Grade 10, £1,025/£1,085. N.J.B. conditions of service.

Applications stating age, qualifications and experience are to be received by Assistant Secretary (Establishments), North Eastern Electricity Board, G.P.O. Box No. 117, Carloli House, Newcastle upon Tyne, within ten days of the appearance of this advertisement. 4366

LONDON COUNTY COUNCIL

South East London Technical College
Lewisham Way, London, S.E.4

REQUIRED, September: (i) LECTURER, and (ii) ASSISTANT GRADE B in Electrical Engineering.

Salary scales (men): Lecturer, £1,370 × £35 to £1,550; possible entry above minimum if justified by experience and present position. Grade B, within the range £700 × £27 10s. to £1,435. Starting point according to experience, etc., maximum according to training and qualifications. London allowance (both posts) £38 or £51.

Application forms from Secretary at College, returnable within two weeks of advertisement date. (1112) 4341

EAST MIDLANDS ELECTRICITY BOARD

Staff Vacancies

APPLICATIONS are invited from suitably qualified and experienced persons for the following appointments. Applications should state age, qualifications, present position and salary, previous experience, and quote the appropriate vacancy number.

Northamptonshire Sub-Area
THIRD ASSISTANT DISTRICT
ENGINEER, Kettering District
(Vacancy No. 44/60).

Salary N.J.B. Class G, Grade 9, £860 × £15 to £905 per annum.

Candidates should have had practical experience of the operation and maintenance of urban and rural distribution systems.

A technical qualification equivalent to the Higher National Certificate in Electrical Engineering would be an advantage.

The successful candidate will be required to undertake standby duty and to reside in or near Corby, Northants.

FOURTH ASSISTANT ENGINEER
(Shift Operation), Sub-Area Headquarters
(Vacancy No. 46/60).

Salary N.J.B. Class K, Grade 12, £860 × £15 to £905 per annum plus shift allowance.

Candidates should have had experience of switching operations on a high-voltage distribution system, preferably including both urban and rural networks. Experience in the issue and cancellation of Permits to Work under the C.E. Safety Rules, or acting as Control Engineer for part of a high-voltage system, would be an advantage.

THIRD ASSISTANT DISTRICT
COMMERCIAL ENGINEER,
Daventry District
(Vacancy No. 47/60).

Salary N.J.B. Class E, Grade 9, £765 × £15 to £810 per annum.

The duties will include the preparation of specifications and estimates for electrical installations, progressing of contracting work and advice to consumers on domestic wiring installations and apparatus.

Applicants should be familiar with the Board's tariffs and should have had previous commercial experience in electrical contracting work, the maintenance and design of domestic electrical appliances, and consumer service. The possession of a suitable technical qualification would be an advantage.

Applications for the above vacancies should be addressed to the Manager, Northamptonshire Sub-Area, 25, Bridge Street, Northampton, within fourteen days of the date of this advertisement.

Nottingham Sub-Area

WAYLEAVE OFFICER
(Vacancy No. 45/60).

Salary N.J.C. Grade 3, £720 × £20 to £780 per annum.

The duties will include the acquisition of substation sites and other properties, negotiation of wayleaves for underground cables and overhead lines, settlement of compensation claims, including damage to crops, etc.

The ability to drive a motor vehicle and the possession of a current driving licence would be an advantage.

Applications should be addressed to the Manager, Nottingham Sub-Area, 35/39, Carrington Street, Nottingham, within fourteen days of the date of this advertisement. 4336

LONDON ELECTRICITY BOARD

Commercial Engineer

APPLICATIONS are invited for the above position in the Board's Northern District at Clapton, London, E.5.

Applicants should have had experience of consumers' service, development, showrooms, tariffs, electrical contracting and maintenance, and the design of space and water heating installations, etc. Corporate Membership of the Institution of Electrical Engineers would be an advantage.

The post is graded under Schedule A of the National Joint Board Agreement as Class J, Grade 6, £1,245 to £1,320 per annum, inclusive of London allowance.

Application form obtainable from the Personnel Officer, 46, New Broad Street, London, E.C.2. Please quote ref. PER/V/2938/R. 4315

ESTIMATOR
ELECTRICAL CONTRACTING

ESTABLISHED and progressive firm requires experienced Estimator for industrial, commercial and public authority contracts. Pension scheme.

Full details in strict confidence to:—

Contracts Director
SERVICE ELECTRIC CO. LTD.
Honeypot Lane, Stanmore, Middx.

4310

Situations Vacant (continued)**MIDLANDS ELECTRICITY BOARD**

APPPLICATIONS are invited for the following superannuable posts:—

Board Headquarters**SENIOR ASSISTANT**

(Purchasing Department).

Applicants should have experience of the purchase and stock control of electrical appliances and contracting materials. Salary £795/£870 per annum. N.J.C. Grade 4.

Apply by letter, within 14 days, stating age, experience, present salary and position to the Secretary, Midlands Electricity Board, Mucklow Hill, Halesowen.

North Staffs. Sub-Area**GENERAL ASSISTANT ENGINEER**

(Planning) (Headquarters).

Applicants should have had general distribution experience, and duties will include detailed design of major substation, specifications for substation equipment, planning and estimating for system extensions. Technical qualifications desirable. Salary £815/£860 per annum (N.J.B. Grade L.14).

Apply by letter, within 14 days, stating age, qualifications, experience, present salary and position to Mr. C. C. Pimble, Sub-Area Manager, Midlands Electricity Board, 234, Victoria Road, Fenton, Stoke-on-Trent.

Shropshire and Herefordshire Sub-Area**FIRST ASSISTANT DISTRICT ENGINEER**

(Shrewsbury).

Applicants should have sound technical training and practical experience in the operation and maintenance of L.V. and H.V. systems up to 33 kV. Technical qualifications desirable. The successful applicant will be required to undertake standby duties. Salary £965/£1,025 per annum (N.J.B. Grade E.5).

THIRD ASSISTANT DISTRICT ENGINEER

(Ludlow).

Duties include the construction, maintenance and operation of H.V. and L.V. mains and substations, and applicants should have had experience in the planning of system reinforcements and mains extensions. Technical qualifications desirable. Salary £765/£810 per annum (N.J.B. Grade E.9).

Apply by letter, within 14 days, stating age, qualifications, experience, present position and salary to Mr. W. Winwood, Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

F. W. CATER,

Secretary. 4332

BOROUGH POLYTECHNIC

Borough Road, London, S.E.1

Principal: James E. Garside, M.Sc.Tech., Ph.D., F.R.I.C., F.I.M., F.Inst. F.

THE Governors invite applications for the following appointments:—

Department of Electrical Engineering and Physics

Head of Department: V. Pereira-Mendoza, M.Sc.Tech., M.I.E.E.

LECTURER IN ELECTRICAL ENGINEERING.

Applicants should be University Graduates in Electrical Engineering and have had industrial, research and/or teaching experience. Specialised knowledge in Heavy Electrical Engineering (preferably, but not essentially in Power Supply) is desired. Courses in Department include Dip.Tech., Part III I.E.E. and H.N.C.

ASSISTANT LECTURER (GRADE B) IN ELECTRICAL ENGINEERING.

Applicants should be University Graduates or Graduate Members of the Institution of Electrical Engineers, preferably with teaching and/or industrial experience in this subject.

SALARY (Men):—

Lecturers: Within the range £1,408 to £1,601 per annum.

Assistant Lecturers (Grade B): Within the range of £738 to £1,486 per annum.

The point of entry on both salary scales and the maximum depending on age, qualifications, training and experience.

Further particulars and application form, which should be returned as soon as possible, obtainable from the undersigned.

FREDK. J. PACKER,

Clerk to the Governing Body.

4307

OLD-established Electro-Mechanical Engineering Contractor intends to appoint a

CHIEF BUYER

Must have comprehensive knowledge of electrical contracting business and some previous experience of mechanical trade.

Good appearance, personality, commercial acumen essential. Technical qualifications an advantage. Age 30/40 years.

Excellent salary. Pension scheme. Opportunity for advancement. Only men of proven record need apply.

Write in confidence to Box No. DL.7349, c/o Whites Ltd., 72, Fleet Street, London, E.C.4.

4304

METROPOLITAN BOROUGH OF CAMBERWELL**Assistant Engineer (Electrical)**

APPPLICATIONS invited for this appointment within salary range of £1,095-£1,405 (Grades A.P.T. IV or V of the National Scales) for street lighting modernisation and maintenance. Grade and commencing salary according to qualifications and experience.

The Council is carrying out a large programme of Group "A" and "B" modernisation and proposes to take over the maintenance of street lighting during the next twelve months.

Applicants should be suitably qualified (preferably Corporate Members of the Institution of Electrical Engineers) and have wide experience in the design and installation of street lighting schemes, together with a sound knowledge of the maintenance of equipment.

Application forms from Town Clerk, Town Hall, London, S.E.5. Closing date 28th May, 1960.

4370

SURREY EDUCATION COMMITTEE**Wimbledon Technical College**

Gladstone Road, Wimbledon, London, S.W.19

APPPLICATIONS are invited for the post of **HEAD of the ELECTRICAL ENGINEERING DEPARTMENT (Grade III)**. Candidates should have had good industrial and teaching experience; previous experience as head of department or in supervisory capacity an advantage. Salary Burnham Scale, £1,800 × £50 to £1,950 plus London allowance.

Particulars of post and application form obtainable from Principal, to be returned by 10th June.

4361

SENIOR AND INTERMEDIATE ESTIMATING ENGINEERS

required by old-established electrical contractor in London.

SENIOR must be capable of laying out, extracting quantities, assessing labour content for lighting, power, instrumentation and cabling for all types of installations.

INTERMEDIATE also capable of same duties under supervision.

Expanding company offering excellent opportunities for advancement. Attractive salaries. Congenial conditions. Pension and bonus schemes in operation.

Write Group Personnel Manager, Box No. DL.7354, c/o Whites Ltd., 72, Fleet Street, London, E.C.4.

4303

CENTRAL ELECTRICITY GENERATING BOARD**South Eastern Division****Littlebrook Power Station****ASSISTANT SHIFT CHARGE ENGINEER**

(Vacancy No. 99/60).

Experience in operation of modern power station plant necessary and possession of H.N.C. preferred. Some experience of oil-fired boilers would be an advantage.

Salary N.J.B. Class L, Grade 8, £1,364 10s. to £1,447 per annum, including London allowance and shift allowance.

ASSISTANT ENGINEER (Mechanical Maintenance)

(Vacancy No. 100/60).

Applicants should have had a wide practical experience in modern power station and boiler house maintenance on both coal and oil-fired boilers, and should possess H.N.C. or equivalent qualifications. A knowledge of the civil works associated with power stations would be an advantage.

Salary N.J.B. Class L, Grade 11, £1,015 to £1,075 per annum, including London allowance.

Applications giving age, details of experience, present position, etc., should be sent to the Station Superintendent, Littlebrook Power Station, near Dartford, Kent, to arrive by 24th May, 1960.

W. H. DUNKLEY,
Divisional Controller.

4360

NOTTINGHAM AND DISTRICT TECHNICAL COLLEGE

Burton Street, Nottingham

Principal:

D. A. R. Clark, M.Sc.(Tech.), M.I.Mech.E.

APPPLICATIONS are invited from suitably qualified persons for the following posts. Previous teaching experience, although not essential, is desirable.

LECTURER IN ELECTRICAL ENGINEERING.

To specialise in Utilisation of Electrical Plant and Machines.

ASSISTANT LECTURER GRADE B IN ELECTRICAL ENGINEERING.

Salaries in accordance with the Burnham Technical Scale as follows:—

Lecturer: £1,370 × £35 to £1,550 per annum.

Assistant Grade B: £700 × £27 10s. to £1,150 per annum plus additions for qualifications and training. Commencing salary according to previous experience.

Facilities and equipment available and time allowed for approved research work.

Further particulars and form of application may be obtained from the Principal, to whom completed forms should be returned not later than 20th May, 1960.

4359

SOUTH OF SCOTLAND ELECTRICITY BOARD**Clyde Area****Third Assistant Engineer, Operation and Maintenance, Area Headquarters**

APPPLICATIONS are invited for the above appointment. Applicants should have had a sound engineering training, followed by experience in the planning and maintenance of an H.V. and L.V. industrial and rural underground and overhead system, and should be Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications.

The conditions of employment will be in accordance with the National Joint Board Agreement for the Electricity Supply Industry and the salary on Class K, Grade 10 of that Agreement, viz., £965/£1,025 per annum.

Applications on the standard form obtainable from this office should be sent to the undersigned within 14 days of the appearance of this notice.

H. B. BRUCE,
Manager.

P.O. Box 15,
206, St. Vincent Street,
Glasgow, C.2.
26th April, 1960.

433

**SOUTH WEST METROPOLITAN
REGIONAL HOSPITAL BOARD****Regional Engineer's Department**

APPPLICATIONS are invited for appointments on the permanent staff of the Board generally in accordance with the Whitley Council conditions of service.

The Board is undertaking a considerable programme of hospital development and the persons appointed will be engaged on varied and interesting work.

ENGINEERING GENERAL GRADE.

Applicants should be (i) Corporate Members of the Institution of Electrical Engineers, or (ii) have passed the Institution's examination, and be Graduate Members, and be experienced in the preparation of specifications, drawings and estimates for electrical installations in hospitals and large public buildings.

Salary scale on or after 1st July, 1960, £910 × £35 (1) × £40 (2) × £45 (5) × £50 (7) to £1,600. Bar at £1,205 for Graduate Members of the Institution. Corporate Members will commence at £1,160 p.a. London weighting allowance of £40-£50 p.a. payable in addition.

Applications stating age, qualifications, experience, present appointment and salary, together with the names and addresses of three referees, should be sent to the undersigned at 40, Eastbourne Terrace, London, W.2, by not later than 16th May.

E. G. BRAITHWAITE,

Secretary. 4358

**SOUTH WEST METROPOLITAN
REGIONAL HOSPITAL BOARD****Principal Assistant Engineers II (Heating and
Ventilating) and (Electrical)**

APPPLICATIONS are invited for the above appointments on the permanent staff of the Board's Regional Engineer generally in accordance with Whitley Council conditions of service.

The Board is undertaking a considerable programme of hospital development and the persons appointed will be engaged on varied and interesting work.

The commencing salary (on or after 1st July, 1960) will be at the minimum of the scale £1,665 × £50 (1) × £75 (2) × £85 (2) to £2,035 plus London weighting allowance of £50 p.a. Applicants must be Corporate Members of the Institution of Mechanical or Electrical Engineers and should be experienced in the preparation of specifications, drawings and estimates for large engineering installations in hospitals and large public buildings.

Applications stating age, qualifications, experience, present appointment and salary, together with the names and addresses of three referees, should be sent to the undersigned at 40, Eastbourne Terrace, London, W.2, by not later than 16th May.

E. G. BRAITHWAITE,

Secretary. 4357

**MERSEYSIDE AND NORTH WALES
ELECTRICITY BOARD**

SALES SUPERINTENDENT required in the Board's No. 3 Sub-Area, covering Wirral and Chester.

Salary within range £1,070/£1,160 per annum (N.J.C. Grade 7).

Candidates should have a good knowledge of electrical appliance trading and sales direction.

Appointment subject to medical examination. Pension scheme.

Forms of application, obtainable from the Manager, No. 3 Sub-Area, Electricity House, Newgate Street, Chester, should be returned not later than 17th May, 1960. 4371

SALES ASSISTANT

OPPORTUNITY exists in sales office of established progressive firm of manufacturing electrical engineers for young man of initiative, preferably with knowledge of export procedure. Prospect of advancement. Pension scheme.

Full details in strict confidence to:—

Sales Manager

SERVICE ELECTRIC CO. LTD.

Honeypot Lane, Stanmore, Middx.

4311

**CITY OF OXFORD
EDUCATION COMMITTEE****College of Technology**

APPPLICATIONS are invited for the following post from 1st September, 1960:—

ASSISTANT GRADE B IN ELECTRICAL ENGINEERING for O.N.C. courses and City and Guilds Electrical Installation courses B and C. Applicants should possess either the Full Technological Certificate in Electrical Installation Work or H.N.C. in Electrical Engineering. They should have good industrial experience on the installation side, and some teaching experience would be an added recommendation.

Salary Burnham Technical Scale for Grade B Assistants, viz.: £700 × £27 10s. and one final increment of £37 10s. to a maximum of £1,150 p.a. Additions for appropriate training and qualifications; industrial experience after 21 may be recognised in fixing the starting salary.

Forms of application and further particulars may be obtained, on receipt of a stamped addressed envelope, from the Principal, College of Technology, Headington Road, Oxford, to whom completed forms should be returned by 18th May, 1960. 4362

**THE BRITISH ELECTRICAL & ALLIED
MANUFACTURERS' ASSOCIATION**

APPPLICATIONS are invited for THREE POSTS OF ASSISTANT in the offices of the Association at Ascot, Berks. In each case candidates should have a good educational background and first-class experience in one of the three fields mentioned below.

Personality and administrative ability will also be looked for. The preferred age is 30/35.

The particular requirements of the posts are as follows:—

POST 1. Experience with large electrical machines.

POST 2. Experience with control gear.

POST 3. A general working knowledge of switchgear and instruments.

A salary commensurate with qualifications and experience will be paid; there is a contributory superannuation fund.

Applications with full details of experience should be addressed to the Establishments Officer, B.E.A.M.A., 36, Kingsway, London, W.C.2. 4195

**CENTRAL ELECTRICITY
GENERATING BOARD****South Western Division**

FOURTH ASSISTANT ENGINEER required in the System Operation Department at Divisional Headquarters, near Bristol.

Superannuation scheme. Salary N.J.B. Class AX/EX, Grade 8, £735-£860/£960 per annum.

Applicants should have had a good general and technical education to Higher National Certificate standard, with an aptitude for mathematics. Steam generating station experience is desirable. Duties include general and statistical work relating to the operation of the Grid Control Room. Some day/evening shift duties in the control room may be required, for which the 10% shift allowance would be paid.

Applications on form A.E.6/ACT, obtainable from the Divisional Secretary, 26, Oakfield Rd., Bristol, 8, should be completed and returned by 14th May, 1960. 4334

SENIOR REPRESENTATIVE

required for the sale of Industrial Lighting Fittings, Control Gear, Low Tension Switchgear, etc., for COVENTRY AND DISTRICT.

This is a splendid opportunity for a man with initiative and ambition. Preference will be given to applicants with industrial lighting sales experience and an established connection in the area with architects, works engineers, electrical contractors and wholesalers.

Company car provided.

Contributory pension scheme.

Full details, experience, age, etc., in strictest confidence to:—

Midland Area Sales Manager

Industrial Division

REVO ELECTRIC COMPANY LTD.

Tipton, Staffs

4309

**SOUTH OF SCOTLAND
ELECTRICITY BOARD**

APPPLICATIONS are invited for a superannuable position as a SENIOR ASSISTANT ENGINEER in the Generation/Operation Test Section of the Chief Engineer's Department at Board Headquarters.

Duties include the routine and acceptance testing of turbo-generator boilers and other station plant, together with the non-destructive testing of materials and component parts.

Applicants should preferably be of degree standard and/or possess Corporate Membership of the Institution of Electrical Engineers or the Institution of Mechanical Engineers. Previous experience in the organisation of power plant testing is very desirable.

Salary N.J.B. Class AX/DX, Grade 2, £1,475/£1,705 per annum.

Applications should be submitted on the standard form which may be obtained from the Secretary, South of Scotland Electricity Board, Inverlair Avenue, Glasgow, S.4, and returned, quoting reference E17/60, not later than 21st May, 1960. 4337

**TECHNICAL SALES
REPRESENTATIVE**

WE require a number of ambitious young men to undergo a thorough training prior to being appointed to our technical sales force.

Applicants should be under 27 years of age, preferably single, possess H.N.C. and be willing to reside anywhere in the country. Experience of medium-voltage electrical switchgear and distribution equipment preferred but not essential. The company operates a pension fund for its employees.

Full details, in strict confidence, to:—

The Sales Director

DORMAN & SMITH LTD.

Atherton Works

Blackpool Road, Preston, Lancs

4125

**NORTH OF SCOTLAND
HYDRO-ELECTRIC BOARD****Assistant Engineer (Research)**

APPPLICATIONS are invited for the position of THIRD ASSISTANT, Grade 6, in the Research Laboratory, Pitlochry. The work will embrace special investigations and development associated mainly with hydro-electric schemes and candidates must have sound knowledge of basic engineering principles, especially those applicable to light power engineering and electronics.

Salary N.J.B. Schedule B, Class AX/DX, £925/£1,140, with placing depending on qualifications and experience. Superannuation scheme.

Applications stating age, married or single, technical qualifications, training, subsequent experience, and posts held, should be sent to the Research Engineer, North of Scotland Hydro-Electric Board, Research Laboratory, Ferry Road, Pitlochry, within 14 days from the date of this advertisement. 4339

**MANCHESTER CORPORATION
WATERWORKS UNDERTAKING**

JUNIOR ASSISTANT ENGINEER (Electrical) required. Salary A.P.T. I (£610/£765) according to qualifications and experience. Age 22-26.

Applicants should have served a recognised engineering apprenticeship, with subsequent D.O. experience, and preferably have H.N.C. or equivalent qualifications.

The position offers interesting all-round experience in the maintenance of installations (domestic, pumping stations, control schemes, etc.) situated in Manchester, at headworks, and on aqueducts; also in the design, construction and commissioning of electrical installations for large plants to be constructed.

Applications stating age, education, training, qualifications and experience to be sent to the Engineer and Manager, Waterworks Department, Town Hall, Manchester, 2, by the 16th May, 1960. 4222

Situations Vacant (continued)**COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE**

ASSISTANT ELECTRICAL ENGINEER required for the County Architect's Office at Wakefield. Salary range: Special Grade, £785-£1,070, or A.P.T. III, £880-£1,065.

Applicants should possess the Higher National Certificate in Electrical Engineering, have served a recognised apprenticeship with a reputable firm and be capable draughtsmen with good experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work.

Applications stating age, qualifications, experience, present position and giving names and addresses of three referees, to be sent to the undersigned not later than Tuesday, 17th May, 1960.

A. W. GLOVER, F.R.I.B.A.,
County Architect.

Bishopgarth,
Westfield Road,
Wakefield.

4343

TECHNICAL ASSISTANT

OPPORTUNITY offers in established progressive firm of manufacturing electrical engineers for young engineer/draughtsman well grounded in all aspects of profession. Prospect of advancement. Pension scheme.

Full details in strict confidence to:—

Managing Director
SERVICE ELECTRIC CO. LTD.
Honeypot Lane, Stanmore, Middx.

4312

ELECTRICAL ENGINEERING ASSISTANT

required with experience in preparing specifications for H.V. and M.V. plant, including switchgear, transformers, and cabling, and general electrical installations in buildings.

For those obtaining H.N.C. (Electrical), prospects of advancement in entry grade to a maximum of £1,135 (under review will probably become £1,250). Pensionable. Staff restaurant. One Saturday only worked in five.

Form from Chief Engineer (GS/ER/1073/5), L.C.C., County Hall, London, S.E.1. 4373

UNIVERSITY OF READING

APPLICATIONS are invited for a **LECTURESHIP** in Farm Mechanisation (Electrical Engineering), to commence 30th September, 1960. Applicants should be graduates in engineering, with an interest in the application to agricultural operations of electronic and other control methods.

Further particulars may be obtained from the Registrar (Room 22, O.R.B.), The University, Reading, to whom applications should be sent not later than 21st May, 1960. 4372

ELECTRICAL CONTRACTING ESTIMATOR AND DESIGNER

APPLICATIONS are invited for the appointment of an **ESTIMATOR/DESIGNER** by a well-known contracting organisation in Glasgow; extensive experience in estimating large contracts essential. This post offers exceptional opportunities of promotion in rapidly developing company. Generous salary and superannuation.

Apply stating age, apprenticeship, any qualifications and training to—Box 4317.

ESTIMATOR

ESTIMATOR required to prepare tenders for special types of motors and generators. Willing to train engineer with reasonable electrical knowledge. Near S.E. London. Attractive salary, superannuation.

Apply Works Director, E.D.C.C., St. Mary Cray, Kent. 4280

ASSISTANT to export manager. This position, which is based on London, is open to a qualified switchgear engineer, preferably with some sales experience. The selected applicant, who will probably be about 30 years of age, will be required to undertake short trips abroad from time to time. Apply in confidence, giving details of past experience and salary required, to Export Sales Manager, South Wales Switchgear Ltd., 19, Woburn Place, London, W.C.1. 4352

VACANCY exists for a progressive and ambitious man with intimate experience of estimating and pricing as applicable to electrical wholesaling. Non-contributory pension and life insurance. Apply giving precise details of experience and state age and salary level to—Personnel Manager, Wholesale Fittings Co. Ltd., 46/54, Commercial St., London, E.1. 4318

AGENT required London and Home Counties by manufacturers of patented compression cable glands. Send details experience, connections, etc., to—Box 4263.

ASSISTANT draughtsman/designer for electrical engineers (London area). Able to assist and prepare quantities, etc. Practical knowledge of factory lighting and power requirements an advantage. Full particulars and salary required to—Box 4208.

ATLAS LIGHTING Limited require a man with wide experience of incandescent lamp manufacture to take charge of high wattage and Group II at their Merthyr Tydfil factory. Salary will be commensurate with experience and suitability for this post. Write in confidence, giving a brief outline of qualifications and experience to—The General Manager, Atlas Lighting Limited, Swansea Road, Merthyr Tydfil, Glam., S. Wales. 4320

B.B.C. requires engineer in wiring unit of planning and installation department in London. The post is temporary for about eighteen months. Applicants should have a Higher National Certificate or equivalent and have served apprenticeship with a well-established firm of electrical contractors. Considerable experience in planning, supervision and testing of low and medium pressure electrical installation work desirable. Duties include planning of such work for office premises and studio centres, preparation of estimates and specifications, supervision and testing of work carried out by contractors, and correspondence. Salary appropriate to experience and qualifications within range £935 to £1,185. Requests for application forms to Engineering Recruitment Office, Broadcasting House, London, W.1, quoting ref. EX.60.17.E.R. 4355

BRITISH ENGINE BOILER & ELECTRICAL INSURANCE Co. Ltd., Longridge House, Manchester, 4. Electrical surveyors required in England and Scotland. Permanent positions carrying progressive salary scale £800 to £1,100 and non-contributory pension. Candidates, aged 26 to 32, with H.N.C. in Electrical Engineering or Grad. I.E.E., and with apprenticeship in manufacture or repair of electrical machinery, are invited to apply stating age, qualifications and experience. 4352

BRYCE ELECTRIC CONSTRUCTION Co. Ltd. have vacancies for senior and junior power capacitor and transformer development engineers. Write Chief Engineer, Bryce Electric Construction Co. Ltd., Kelvin Works, Hackbridge, Surrey, stating age, experience, qualifications, and salary required. 4321

CLERK required by large London electrical contractors, to be responsible for the prices of all materials. Permanent and superannuated position. Previous experience in the trade essential. Reply, giving full details, to—Box 4265.

CLERK required (male or female) for buying department, with knowledge of electrical and engineering terms and able to type. S.W. London area.—Box 4292.

CONSULTING engineers require senior and junior electrical engineers for the design and supervision of electrical installations in all types of buildings. Good salaries and working conditions available to suitable applicants. Write giving full details to—Box ER.349, L.P.E., Romano House, 399/401, Strand, London, W.C.2. 4281

CONTRACTS engineer required with experience in power and lighting layouts in buildings. The post is progressive and preference will be given to an applicant holding H.N.C. or attending course of study. Good salary. Two weeks' holiday in current year. Apply—C. MacKechnie Jarvis & Partners, 34, Victoria Street, London, S.W.1. 4199

DEVELOPMENT engineer for work in electric heater development laboratory. Minimum qualification O.N.C. Salary according to ability and experience.—Personnel Officer, E. K. Cole Limited, Malmesbury, Wilts. 4316

DRAUGHTSMAN required for work in lighting fittings design office. Write stating age, salary required and full details of experience, etc., to—Box 4291.

ELECTRIC welder required by Ministry of Labour as instructor (unest.) at the Government Training Centre, Gill Avenue, Fishponds, Bristol. Applicants must be British subjects who are (a) experienced and fully skilled; (b) able to teach their trade; (c) supervise the work and maintain control of trainees engaged in their trade. They should have undergone the training usual in their trade followed by at least five years' practical experience. Applicants should preferably possess O.N.C. or C. and G. Cert. or equiv. quals. where appropriate. Selected applicants will be required to pass a theoretical test before and a practical test after appointment. Commencing salary (at age 28 or over) £800 rising by annual increments to £925 p.a. Application forms obtainable from Staff Section, South Western Regional Office, Ministry of Labour, Bridge House, Clifton Down, Bristol, 8, within seven days. 4342

ELECTRICAL draughtsman. A good opportunity is open for a man of above average capability with a firm of consulting engineers in London to undertake the preparation of design, drawings and specifications for power lighting installations covering all types of commercial and industrial buildings. Good salary offered to the right man. Write in the first instance stating age, salary and experience to—Box 4283.

ELECTRICAL draughtsmen required, familiar with power and lighting installation design for all types of commercial and industrial buildings. A knowledge of motor control applications an advantage. Please apply giving age, training and experience to—Box 4282

ELECTRICAL engineer required for Glasgow office staff, age 23-28. Applicants (H.N.C. minimum) should have had experience in the manufacture of electrical machines. Progressive salary with non-contributory pension. Applications stating age, nationality, qualifications and experience to British Engine Boiler & Electrical Insurance Co. Ltd., 98, West George Street, Glasgow, C.2. 4353

ELECTRICAL engineer intermediate draughtsman with experience in the design of power and lighting installations for modern building projects are offered progressive careers. Five-day week and all mod. cons. Apply in confidence to—Pashler & Partners, Consulting Engineers, 73, Southampton Row, London, W.C.1. 4269

ELECTRICAL engineering asst., Borough Surveyor's Dept., Fulham Borough Council. Salary within range £630/£1,100. Applicants must have had experience in design and installation of street lighting and good general experience of electrical installations. 5-day week. Canteen. Details and application form from Town Clerk, Town Hall, London, S.W.6. Closing date 16th May. 4344

ELECTRICAL testing engineer required to take charge of a small test department dealing with electrical power resistors, heaters and other electrical equipment. Some electronic experience would be an advantage though this is not essential. Applicants should have the H.N.C. in Electrical Engineering and should write giving full details of experience, age and salary required to—The Expanded Metal Co. Limited, P.O. Box 14, Stranton Works, West Hartlepool. 4293

ELECTRICAL wholesalers require experienced sales representative for Black Country, Birmingham area. Car provided. Apply with full details of previous experience and salary required to—Box 4322.

ELECTRICIAN required for maintenance work and small installation contracts. Driving licence advantageous.—Tel. BIS.4752. 4314

ELECTRICIAN with an interest in electronics required by leading London lamp manufacturers. Interesting post with good prospects for keen young man. Write, stating age, experience and present wages to—Box 4374.

FOREMAN electrical fitter required. Applicants must have wide experience in substation construction work and be capable of supervising and controlling men engaged in this type of work. Conditions of service and salary £725 per annum (Schedule E, Grade 2) in accordance with N.J.I.C. Agreement. The successful applicant will be based at Sub-Area Headquarters, Ditherington, Shrewsbury, and must be prepared to work and lodge away from home on occasions. Apply by letter stating age, experience and present position Mr. W. Winwood, Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury. 4333

ESTIMATOR required for wood pole line contracts up to 33 kV. Experience of cable laying and internal wiring an advantage. Applications in writing stating experience and salary required to—B. French Limited, Pike Mills, Kidderminster. 4284

HEATING engineer for leading manufacturers of electric floor warming system. Grad. I.H.V.E. minimum standard of qualification with experience in heat loss and design calculations. Scope and prospects in expanding organisation for individual with initiative and having electrical bias. Full details stating salary required to—Box 4323.

INSPECTOR required for small factory in N. London manufacturing sheathed heating elements and electric domestic appliances. Previous industrial experience in similar field essential. This is a staff appointment with a commencing salary in region of £12/£13 p.w. Write—Box ER.352, L.P.E., Romano House, 399/401, Strand, London, W.C.2. 4290

JUNIOR electrical draughtsman, O.N.C. standard, required for general engineering and electrical motor manufacturers in N. London area. Permanent pensionable positions with free life assurance. Full details to—Box 4345.

LARGE electrical contractors in S.W. England wish to appoint a senior installation engineer to take charge of their installation department. Responsibilities include recruitment and control of labour, site supervision and material ordering. This is an excellent opportunity for a man aged 30-40 with sound contracting experience and capacity for future managerial status. A car will be provided and there is a pension scheme. Reply in confidence giving full details to—Box 4375.

LARGE London electrical engineering contractors require supervising engineer. Must be capable of handling projects from enquiry stage to final completion. Excellent prospects for right man. Permanent, superannuated position. Please write giving full details to—Box 4210.

LONDON company manufacturing electrical motor control equipment invite applications from junior electrical engineers for the position of technical representative. Successful applicant will be required to operate from our Nottingham office. Previous selling experience would be an advantage. Contributory pension scheme. Apply in writing giving full details of age, qualifications and background experience to our Area Manager, Dewhurst & Partner Ltd., Bentinck Building, 15, Wheeler Gate, Nottingham. 4182

PYROTENAX Limited require a well-spoken personable man with electrical wiring experience (preferably including "Pyrotenax"), age 35 or over, for well-paid position as chief demonstrator at their London office. Please apply with fullest details of history to the Sales Manager, Pyrotenax Limited, Hebburn, Co. Durham. 4294

REPRESENTATIVE required by leading electrical wholesalers for North London area. Excellent opportunity for energetic man with an existing connection and proven sales record. Non-contributory pension and life insurance. Applicants should state age and give full details of past and present employment to Personnel Manager, Wholesale Fittings Co. Ltd., 16/54, Commercial St., London, E.1. 4319

REQUIRED for consulting engineers' office, London, S.W.1 district, an assistant electrical engineer/draughtsman. Commencing salary from £650 according to age and experience. Good prospects for advancement in expanding practice. Two weeks' summer holiday. Ring ABBey 6712 for appointment. 4200

SALES engineers. Young engineers over 21 years required for indoor staff of sales department. Technical and works training in electrical engineering practice, at least to O.N.C. standard, is required by West London engineering company specialising in explosion-proof and industrial electrical control gear as well as other electrical equipment for industry. Candidates, replying, should state age, training, qualifications and anticipated remuneration, in confidence, to—Box 182.

TECHNICAL clerk required to write requisitions and bills of materials for electrical installation equipment as used in oil and chemical refineries. Must have good knowledge of all types of electrical materials, their use and availability. Office located in Central London. Good conditions, contributory pension scheme, subsidised luncheon club. Write stating experience and salary required to—Box 4346.

STOREKEEPER required, only first-class applicants with substantial experience in electrical wholesaling will be considered. More than average salary is offered in return for ability and efficiency. Permanent superannuated post for right man desirous of progress. Canteen available.—Halsey's, Fulham 3355. 156

SUPERVISING engineer required for L.V. and 11-kV underground and overhead cable contract work in South Wales. Electricity Board experience desirable. Apply stating age, experience and salary required to—Box 4324.

SUPERVISING engineer required with good labour control experience, knowledge of industrial installations, able to carry out complete supervision of contracts up to preparation of final accounts and measurements. Write giving particulars of experience, salary required and date of availability to—Box 4295.

TRANSFORMER designer estimator wanted, capable of preparing quotations for transformers up to 2,000 kVA. Cardiff area. Salary £850 p.a. upwards according to qualifications. —Box 4347.

TRANSFORMER designer for various types up to 5 MVA capacity. Salary according to experience and qualifications. Full details to—Chief Designer, London Transformer Products Ltd., Industrial Estate, Bridgend, Glam. 4159

WELL-known electrical wholesalers require first-class counter assistant, able to take charge. Good salary, prospects. Holiday commitments honoured. Outer London district. Full details to—Box 4148.

WORKING foreman required to take charge of small but expanding electrical repair shop in South-West. Applicant must be used to all types of A.C. and D.C. windings and should be able to attend and affect temporary repairs on site. Salary will be in accordance with qualifications and ability. Whilst the present vacancy is for foreman the successful applicant will be expected to take over management at an early date. Reply in confidence to—Box 7521.

APPOINTMENTS FILLED

Dissatisfaction having so often been expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

SITUATIONS WANTED

ELECTRICAL ENGINEER, currently General Manager overseas for well-known U.K. contracting company, wishes return U.K. next April. Desires contact companies interested appointing Director/Executive with unusually wide engineering experience and top-level management. Home or overseas, except Africa. £2,000-£3,000 available investment or good faith. Age 40. A.I.E.E., M.A.S.E.E. High references with solicitors/bankers if desired. Real ability, dynamic energy guaranteed.—Box 7504.

ADVERTISER, 45, with 25 years in contracting field, including management, desires position as sales engineer in Manchester area.—Box 9999.

A.M.I.E.E. seeks smaller firm following merger and present surfeit of seniors. 45. Well educated. French, German. London based but used to sudden travel. Wide experience of light and medium engineering. More recently sales after many years design, production and installation. Min. starting salary £1,400.—Box 7512.

DEMOTED due to merger, experienced sales representation, office management, etc. Over 20 years electrical and engineering industries. Aged 38. Resident Leeds.—Box 7519.

ELEC. engr., cont./exp., design/est./sup./sales, desires position London or South Coast.—Box 7523.

ELEC./engineer with wide exp. desires responsible post in supervisory capacity, S. Coast.—Box 7524.

ELEC. eng. (30), exp. all aspects contracting, home, overseas, domestic, commercial, industrial, tea, rubber, jute factories, seeks position home or overseas.—Box 7503.

ELECTRICAL designer, induction motors, 28, H.N.C., H.S.C., seeks post as technical representative or designer.—Box 7500.

ELECTRICAL engineer, wide experience in conversion schemes and tariff negotiations with electricity boards. Prepared to act part time for individual or group concerns as adviser.—Box 7515.

ELECTRICAL engineer (25), student apprentice to standard of Parts I, II and III, I.E.E., seeks generation/transmission/distribution post anywhere, sunny climate, not U.K.—Box 7502.

LAD (16) desires apprenticeship or job as electrician's mate.—R. Kelsey, 83, St. Mary's Tower, London, E.C.1. 7506

MAN (35) seeks interesting position with go-ahead firm in Midlands. 20 years' experience electrical wholesaling.—Box 7507.

OWING to company merger, former sales representative and branch manager of an electrical manufacturing company seeks appointment. Apprenticeship served in electrical engineering. Located Edinburgh area.—Box 7518.

ARTICLES FOR SALE

600

WARD LEONARD SETS

All incorporating motor generator sets comprising slipring motors normally 1,440 or 960 r.p.m., with direct coupled generators and excitation equipment, together with A.C. and D.C. control gear.

TYPICAL WORK MOTORS

H.P.	Maker	Voltage	Speed
0/340	E.E.C.	0/480	0/1500
0/225/225	HARLAND	0/250	0/1450/1750
0/300	W'HOUSE	0/230	0/1750
0/150	CROM.PARK.	0/480	0/1000
0/150	MET-VICK.	0/500	0/5000
0/130/150	M. & PLATT.	0/500	0/360/500
0/130	L.D.C.	0/220	0/1000
0/100/100	L.D.C.	0/220	0/750/960
0/95	ALLEN	0/220	0/1300
0/60/60	ALLEN	0/230	0/1300/1500
0/74	L.S.E.	0/480	0/2900
0/60/60	E.E.C.	0/500	0/2000/2900

Others available down to 3 h.p. Wide choice of speeds all covered by guarantee.

GEORGE COHEN

Sons & Co. Ltd.
Wood Lane, London, W.12
(Shepherds Bush 2070)
Stanningley, Nr. Leeds
(Pudsey 2241)

4377

LONDON WHOLESALE WAREHOUSE

G.E.C. Consumer Cabinets, Cat. CA 6222, complete with 8-way rewirable panel 60A. cutout and neutral connector. £5. 5. 0. each. List price £9. 10. 8d.

REVO 500volt 100amp Galvanised S.P. & N. Switch-fuses £3 each.

Series 2 Meggers, Cat. 54008 £38, Cat. 54244 £42 Cat. 54009 £46.

SIEMENS 7/029 3-core T.R.S. Cable, 100 yd. Drums £5.

Large quantity of all types of switchgear available.

All goods brand new and in makers' wrappers.

165 QUEEN'S ROAD, PECKHAM LONDON, S.E.15

Telephone: NEW Cross 7143-0890 4126

ELECTRIC HOUSE SERVICE METERS

PREPAYMENT and credit, 200/250 v. A.C., s/p., 50 c., 2½-100 A. Fixed or variable tariff. Reconditioned, fully tested and guaranteed 2 years. Prompt delivery, carriage paid.

ALBERTE METER COMPANY
87/89, Sterte Avenue, Poole, Dorset
(Tel.: Poole 272)

371, West Green Road, Tottenham, London, N.15 (Tel.: Bowes Park 7080) 19*

MOTORS FOR SALE

75-h.p., totally enclosed, fan cooled, slipring type, 1,450-r.p.m. CROMPTON PARKINSON Motors. Unused. 380/420 volts, 3-phase, 50 cycles, or 220/240 volts.

Offers to Henry Simon Ltd., Power Department, Cheadle Heath, Stockport. 4296

Articles for Sale (continued)

600**COMMUTATOR MOTORS**
400/440/3/50

H.P.	Make	Speed	Remarks
67.5/270	B.T.H.	95/370	Schrage
35/70	B.T.H.	650/1300	Schrage
20/40	B.T.H.	300/1000	Schrage
20/40	B.T.H.	45/90	Geared
1.5/5	L.S.E.	900/3000	Ind.Reg.Control
.3/8	L.S.E.	800/3000	Ind.Reg.Control

400 CPS ALTERNATORS

New, 5 kVA, 115/200 volts-3-400 cps, dual voltage (delta/star) sinusoidal wave for, 3,000 r.p.m. Rectifier excited with A.V.R. Ex stock.

Other sizes up to 40 kVA for short delivery.

GEORGE COHEN
Sons & Co. Ltd.Wood Lane, London, W.12
(Shepherds Bush 2070)Stanningley, Nr. Leeds
(Pudsey 2241)

4376

HOUSE SERVICE METERS

200-240-v. A.C. or D.C., 10 amps. capacity, quarterly type, from 25s. each, plus 2s. 6d. carr.

UNIVERSAL ELECTRICAL CO.
221, City Road, London, E.C.1

37

A.A. ELECTRICAL CO. for A.C.-D.C. motors, switchgear, exhaust fans, hoists, reduction gears, new or reconditioned units.—CHL 5105. 67, Rothschild Rd., London W.4. 57

A BABCOCK & Wilcox water tube boiler will cut down your fuel costs; we can supply from stock. Two 40,000 lb. evap., 220 lb. w.p.; one 25,000 lb. evap., 200 lb. w.p.; 3,000 lb. evap., 400 lb. w.p.; Spencer Bonecount boiler; also Marine, Cornish vertical, etc.—Burford, Taylor & Co. Ltd., Boiler Specialists, Burtayco House, Church Street, Middlesbrough (Tel. Middlesbrough 2622). 122

A C. and D.C. 1/- slotmeters. Guaranteed 2 years, 2½-50 amps. From 55/-. Repairs and recalibrations. See Billiard: Tradex Meter Co., Surbiton (Tel. Elmbridge 2234/5/6). 169

A C. and D.C. motors, generators, from stock.—Service Electric Co. Ltd., Honey Pot Lane, Stanmore, Middx. (Edgware 5566/9). 91

A LTERNATORS and generators, all types up to 150 kW.—Powerco Ltd., 312, York Road, London, S.W.18 (VAN. 5234). 151

A LTERNATORS, 3-phase, all sizes in stock from 7 kVA up to 330 kVA.—Britannia Manufacturing Co. Ltd., 20/26, Britannia Walk, London, N.1 (CLerkenwell 5512). 24

B ARGAINS in electric motors from A. Cooksley & Co. Ltd., 21/25, Tabernacle Street, London, E.C.2. Ring Monarch 3355. 50

B ILLIARD Meters. 1/-, 6d. or 1d. slot. All time settings. From 170/-. See Quarterly.—Tradex, Surbiton. 170

C ABLE, underground, all types ex stock.—E. M. Tatton Co. Ltd., Kew Bridge, Brentford (ISLeworth 4534/5). 117

C ABLE, underground, PILC/VIR/LC, ex London stock. Cutting orders same day delivery London area. Send for priced stock lists.—Batt Electrical Co., 6, Dock Street, London, E.1 (Tel. ROyal 5905). 316

C IRCUIT breakers, various sizes in stock, A.C. and D.C., 200 amperes up to 2,000 amperes. Also dynamo and alternator switchboards.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 26

C ONVERTERS, motor-alternators, motor-generators, frequency changers, etc. All types up to 100 kW.—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 150

C RANE motors. Direct current, series wound or compound wound, all voltages. We have large stocks.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 22

D IESEL generating sets, all sizes to 500 kW. Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 16

E LECTRIC motors, dynamos, alternators and motor generator sets of all sizes. We hold one of the largest stocks in England. New and reconditioned, with 12 months' guarantee.—Britannia Manufacturing Co. Ltd., Britannia Walk, London, N.1 (CLerkenwell 5512, 3 lines); also Works and Stores, Chobham, Surrey. 20

E LECTRIC motors and generating equipment.—E. M. Tatton & Co. Ltd., Kew Bridge, Brentford (ISLeworth 4534/5). 116

E LECTRIC motors, generators, motor generator sets, transformers, switchgear, etc., large comprehensive stock, overhauled and guaranteed. Copy of our Register, "Electrical Surplus," containing thousands of items of electrical plant, sent on request.—R. F. Winder Ltd., Belgrave Electrical Works, Leeds, 2. 54

E LECTRIC motors, generators, control gear, transformers, A.C. and D.C., new and reconditioned; all covered with our usual 12 months' guarantee; large stocks available.—Electropower Co. Ltd., Kingsbury Works, Kingsbury Road, London, N.W.9 (Colindale 4621-2). 42

E LECTRICIANS, Send for details Shaftesbury lightweight "Bantam" ladders. Top sections fitted with patent moulded rubber blocks, eliminate possibility of scratching or marking walls, fascias, and other painted or highly polished surfaces. Also available for immediate delivery, steps, platform steps, trestles, telescopic trestles, pole and builders-type ladders, and all sizes of two and three-section extension ladders.—Shaftesbury Ladders Ltd. (E.R.), 453, Katherine Road, London, E.7 (Phone: Grangewood 3363/4). 111

F LUORESCENT tubes reconditioned and guaranteed with a life as new for 7s. 6d. each. Free collection and delivery in Lancs and Yorks. Save 40% on your tube replacement costs by using this service. We are also manufacturers of top quality fluorescent fittings, trunking systems, control gear and new fluorescent tubes. Generous discounts available.—Anglo-American Electrical Company, Olive Street, Bury (Telephone, Bolton 7251). 212

F OR sale, good, unused and used machinery, including electric motors, A.C. and D.C., dynamos, alternators, transformers, diesel and steam electric generating sets, mains failure sets, motor generator and Ward Leonard sets, switchgear, compressors, fans, capacitors, etc.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford, Herts (Tel. B.S. 1000/1). 161

G ENERATING sets, portable or stationary, new and reconditioned, 1 to 100 kW, A.C. and D.C.—Powerco Ltd., 312, York Road, London, S.W.18 (VAN. 5234). 148

K ARDEX, Roneodex and Shannovue cabinets, as new.—F. H. Jolly & Co. Ltd., 289, King St., London, W.6 (RIV. 5381). 202

L AMPHOLDERS, ½", B.C.S.C. brass. High quality at competitive prices.—N.L.C., 40, Manchester Street, London, W.1 (Welbeck 3300). 4348

M OTOR generator sets and converters, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, City Road, London, N.1 (Tel. CLerkenwell 5512, 5513 & 5514). 12

M OTORS and control gear, huge stocks all types, ½ to 200 h.p.—Ramsbottom & Co. Ltd., Elec. Engineers, Keighley (3774/5/6). 70

N AMEPLATES, engraving, diesinking, stencils.—Stilwell & Sons Ltd., 153, Far Gosford Street, Coventry. 108

O NE No. 3 8-line, 3-deck Poutier vertical paper lapping machine, virtually unused.—Box 4349. 11

P HASE converters, single to three-phase, several sizes in stock up to 90 h.p., 3-phase loading.—Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 29

P LATING dynamos and motor generator sets, various sizes from 500 amps. up to 2,000 amps., with A.C. and D.C. motors.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, London, N.1. 15

P OLYPHASE kilowatt hour meters. Available from stock.—Universal Electrical, 221, City Road, London, E.C.1. 40

P REPAYMENT is. slot house service meters.—Universal Electrical, 217-221, City Road, London, E.C.1. 36

P URLEY chokes and ballasts. Our 80-w. tapped h.p.f. ballast with starter switch-holder incorporated is proving itself the most popular unit. Suitable for most fittings, 57s. 6d. each subject.—F. F. Blanshard Ltd. (Dept. ER), Purley, Surrey (Uplands 4818/9). 52

Q UARTERLY credit meters, single and poly-phase, 2½-100 amps. From 20/-. Also D.C. See Television.—Tradex, Surbiton. 171

R OTARY converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 34

S MALL BR screws and nuts in steel, brass and stainless steel, from stock.—Premier Screw & Repetition Co. Ltd., Woodgate, Leicester. 180

T ELEVISION slotmeters and time switches. Details from: Tradex Meter Co., Surbiton (Eimbridge 2234/5/6). 172

T IME switches, timers and contactors from stock. Lists from J. W. Hughes, 3, St. Thomas Street, London Bridge, London, S.E.1 (Tel. HOP 2759). 178

V ENNER time switches, 200-240 v., A.C./D.C., 10-50 amps., from stock.—Universal Electrical Co., 221, City Rd., London, E.C.1. 38

W ARD Leonard motor generating sets, all sizes.—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1 (Tel. CLerkenwell 5512). 10

2 -speed motor, 40/20 h.p., 950/480 r.p.m., T.E.F.C. slipping type by L.D.C. with Igranic automatic control panel. Further details from—Dynamo & Motor Repairs Ltd., North End Road, Wembley Park. 78

150-h.p., 730-r.p.m. slipping motor, 400/440 volts, 3-phase, 50 cycles, by G.E.C., with ball/roller bearings, complete with Brookhirst starting panel. For immediate despatch with guarantee.—Dynamo & Motor Repairs Ltd., North End Road, Wembley Park. 86

180-h.p., 970-r.p.m. T.E.F.C. slipping motor by Lancashire, 400 v., 3-phase, 50 cycles, complete with fully automatic starting panel. Further details from—Dynamo & Motor Repairs Ltd., North End Road, Wembley Park. 77

200-kW motor generator set, 750 r.p.m., input 6,600/3/50, output 230 volts, 870 amps. D.C. Details—23, Sundial Lane, Birmingham, 22a. 4297

200 sodium lamp transformers (Revo), 200-220 v., 140 w. (unused), 20s. each. Mercury and high wattage lamps 300-1,500 w., lowest prices. Lists on request.—Suplex Lamps Ltd., 239, High Holborn, London, W.C.1. 4133

210-h.p., 730-r.p.m. L.D.C. screen protected slipping motor, 440 volts, 3-phase, 50 cycles, with ball and roller bearings, complete with Brookhirst type starting panel. Further details from Dynamo & Motor Repairs Ltd., North End Road, Wembley. 87

400-cycle to 1,500-cycle motor alternators and alternators.—Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 27

500-kW, 220-volt Met-Vick. rotary converter, with transformer, 11,000 volts, 3-phase, 50 cycles, and accessories.—Britannia Mfg. Co. Ltd., Britannia Walk, London, N.1. 17

500/625-kW L.D.C. generator, 240 volts, 2,080/2,600 amps., D.C., compound interpolate with single bearing for direct coupling at 1,000 r.p.m., or on combination bed with new L.D.C. slipping motors, 900 h.p., 990 r.p.m., 3.3 kV or 6.6 kV, complete with switchgear in approximately six months. Also duplicate generator and spare armature. Further details from Dynamo & Motor Repairs Ltd., North End Road, Wembley. 84

EQUIPMENT FOR HIRE

G ENERATING set hire service. Consult the most experienced hire firm for A.C. and D.C. units from 2 kW to 240 kW, diesel or petrol stationary or mobile, sale or hire. 24-hr. breakdown service.—Dawson-Keith Ltd., Hillview Rd., Sutton, Surrey (Fairlands 4401). 4

ARTICLES WANTED**WANTED**

D.C./A.C. Motors, Transformers, Cables and all redundant Power Station Plant wanted for dismantling.

ASK US TO QUOTE

B. M. T. CO. LTD.
London Road, Barking
(RIP. 3387/3715)

HARRINGTON & Sons, reclamation contractors, want redundant A.C./D.C. electric motors and transformers, stocks of cable, etc.—109, Beaconsfield Street, New Beckton, East Ham, London, E.6 (ALB. 1388). 315

MERCURY (Quicksilver) wanted. Write for packing instructions. Gold, silver and platinum also purchased.—Collingridge & Co. Ltd., Riverside Works, Riverside Rd., Watford (Tel. 5963). 114

QUICKSILVER and beryllium copper scrap urgently required, best prices, prompt cash. Sterling Products Ltd. Edmonton 4541 PBX. 293

SILICON steel offcuts required.—Box 138.

WANTED, D.C. and A.C. ball-bearing motors, motor generator sets, dynamos and alternators. Full details to—Britannia Manufacturing Co. Ltd., 22-26, Britannia Walk, London, N.1. 13

WANTED for prompt cash, ferrous and non-ferrous scrap, also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. & H. Cooper Ltd., 176, Brady St., Bethnal Green, London, E.1. 120

WANTED, rotary converters, any sizes.—Universal, 221 City Rd., London E.C.1. 35

WANTED, small ex-W.D. generators, type UO, ref. 5U/2362, 3,000 w. D.C. and 1,200 watts A.C.—Box 4298.

WANTED, surplus stock cable, all types and sizes. We can inspect.—Box 220.

WANTED, 20/25-kW contact type rectifier unit suitable for a 440 volts, 3-phase, 50 cycles supply, with output approximately 480 volts, 2-wire d.c.—Box 4379.

WANTED, 100/130-kVA welding transformer, complete with chokes and suitable for a 440 volts, 3-phase, 50 cycles supply.—Box 4380.

WORK WANTED AND OFFERED

ELECTRICAL engineers have a certain amount of surplus capacity available immediately for the design and manufacture of rotating electrical equipment, including certain types of control gear. Knowledge of approved type equipment to Buxton requirements.—Greenwood & Batley Ltd., Leeds 12 (Tel. Leeds 20011). 7520

COMPANY MEETINGS

THE TELEGRAPH CONDENSER COMPANY

Record Output, Turnover and Profit

Mr. D. W. Aldridge on Capital Proposals

THE 27th Annual General Meeting of The Telegraph Condenser Company Limited was held on 4th May at the offices of the company, Wales Farm Road, North Acton, London, W.3, Mr. D. W. Aldridge, M.C., M.I.E.E. (the chairman), presiding.

The following is his circulated statement:—

It gives me great pleasure to be able to present to the members a statement of profit which represents an all-time record in the history of the Company.

Group Trading Profit at £769,980 compares with £529,665 for 1958 and represents an increase of £240,315, or rather more than 45%. The improvement is due to a substantial increase in turnover achieved by the U.K. Company, and to further improvements in manufacturing efficiency.

Taking into account the substantially increased liability for taxation, the net profit, before appropriations, is £131,867 up at £319,353.

It is proposed to transfer £200,000 to General Reserve and to pay a final dividend of 20% plus a cash bonus of 10%, both less income tax, making with the 5% interim already paid total distribution for the year of 35%. These proposals will leave the Group Carry-Forward £14,042 up at £180,990.

Trading Conditions

Shareholders will have realised from reading many articles devoted to the subject, both in the National and Financial Press, that makers of radio and television, as well as commercial and domestic electrical equipment, enjoyed a boom year, and their success naturally benefited our Company to a marked degree.

Both output and turnover represented an all-time record and, throughout the year, prac-

WINDING CAPACITY AVAILABLE.
TRANSFORMERS, COILS,
RESISTANCES—ANY QUANTITY.
ALSO EXPERIMENTAL
WORK UNDERTAKEN.

W. L. R. S. LIMITED
Delta House, Fauconberg Rd., London, W.4

4325

A.C. and D.C. motor rewinds and repairs. Prompt service, fully guaranteed.—Edgware 5566/9; Service Electric Co. Ltd., Honey-pot Lane, Stanmore, Middx. 92

PRODUCTION winding of armatures, stator, coils, transformers. Also special motors. Prompt and reliable deliveries.—Lewis Electric Motors Ltd., Moor Wks., Maidenhead, Berks. 194

TRAFFOLYTE labels for switchgear, distribution boards, etc. Prompt deliveries. Competitive prices.—A. E. Cliff & Co., 83, King Street, Fenton, Stoke-on-Trent. 4326

AGENCIES

AGENCIES required for Eire and Northern Ireland for electrical accessories, domestic appliances and industrial equipment. Storage space available in Dublin. Advertiser at present in London and is available for discussions.—Box 7522.

BRITISH agents having large ramifications within the electrical field seek additional agencies from Continental manufacturers of electrical accessories, small domestic electric appliances, etc. Substantial references and ample finance available.—Box 119.

CONDUIT fittings. Agent required with wholesale connections for the Newcastle-on-Tyne and Middlesbrough areas. Please give full details as to agencies held and ground covered.—Box 7517.

NEW Zealand manufacturers' representative, with strong connections power supply authorities and wholesalers in industrial and domestic fields, now in this country, seeking agencies for new and established products. Write—Box 6613, Frost-Smith Advgs., 64, Finsbury Pavement, London, E.C.2. 4299

tically the whole of our plant and machinery was operated to capacity. As has been our practice over many years much time and effort has been devoted to research with the object of improving the technical qualities of our products and also of developing machinery and equipment to achieve still greater efficiency in our manufacturing processes. During the year a number of additional machines have been brought into production, and these have assisted in meeting to a major extent the unprecedented demands of our customers.

Our factory in Scotland, established in the late nineteen-forties, has continued to expand and make a substantial contribution to total output. Some 1,500 people are now employed there, and your Company is thus assisted in fulfilling, in no small measure, the Government's aim to provide full employment in Scotland.

Export and Overseas business was extremely satisfactory, with the exception of our Canadian subsidiary, whose results were disappointing, due once again to depressed trading conditions in that country. The situation is, however, receiving careful attention and I am pleased to report an improving trend.

Outlook for 1960

Recently there have been indications of some tightening of the Government's monetary policies, and any accentuation of this could cause some setback to the Company's expansion.

Currently, however, the order book is satisfactory, business is brisk, and if demand continues at the present level your Company should again enjoy a satisfactory year.

Capital Structure

Your Directors consider that part of the General Reserve, now standing at £800,000, should be capitalised in order to bring the issued capital more in line with the capital employed in the business. With this in view you will be asked at the Annual General Meeting to approve a resolution to increase the Authorised Capital by £500,000 by the creation of 1,000,000 new Ordinary Shares of 10s. each.

TECHNICAL sales engineer with good connection all Scotland, Northern Ireland amongst electricity boards, large industrial users, contractors, wholesalers and large stores, willing to represent as agent additional manufacturer.—Box 4300.

BUSINESSES FOR SALE AND WANTED

ELECTRIC LIGHTING FITTINGS

OFFERS invited for old-established company in Birmingham, manufacturing complete electric lighting fittings and component parts for the electrical trade.

Particulars from Ridsdale, Cozens & Purslow, Chartered Accountants, Hatherton Road, Walsall. 4378

RADIO and television retailers and electrical engineers' business for sale. Branches main streets Carlisle and Langholm. Price £600. Apply—L. Lennox Martin Limited, 15a, Lonsdale St., Carlisle (Tel. Carlisle 26234). 4350

PATENT NOTICES

PATENT No. 710471, entitled "Means for making electrical connections," is for sale or licence. For details apply to—Chatwin & Company, Chartered Patent Agents, 253, Gray's Inn Road, London, W.C.1. 4285

PATENT No. 788222 for "Improvements in or relating to electromagnetic induction apparatus for fluorescent lamps." Owners desire to meet all demands for the utilisation of this patent and invite enquiries from manufacturers and others in Great Britain prepared to assist in its commercial exploitation. Address—Pollak, Mercer & Tench, Audrey House, Ely Place, London, E.C.1. 4351

EDUCATIONAL

CITY and Guilds (Electrical, etc.) on "No pass—No fee" terms. Over 95% successes. For details of modern courses in all branches of electrical engineering, applied electronics, automation, etc., send for our 148-page handbook—free and post free.—B.I.E.T. (Dept. 12a), 29, Wright's Lane, London, W.8. 100

If this increase is approved by the members your Directors propose that £300,000 of the undivided profits at present standing to the credit of General Reserve Account should be capitalised and applied in paying up in full 600,000 Ordinary Shares of 10s. each, which would be issued credited as fully paid to existing Ordinary Shareholders in the proportion of one new share for each existing two shares held by them at the close of business on 22nd April, 1960.

It is proposed that the new shares should rank pari passu in all respects with the existing Ordinary Shares save that they will not participate in any dividend or cash bonus declared in respect of the year ended 31st December, 1959.

Personnel

We are indebted to our Management, Staff and Workpeople for the splendid results of the year's operations, and I know you will wish to join me in expressing to them our sincere appreciation of their achievements, and in tendering special thanks to Mr. P. A. Sporing, our General Manager, under whose leadership and guidance the affairs of the Company are so ably conducted.

Directorate

Owing to my desire to reduce in some measure my business commitments, this is the last occasion on which I shall address you as Chairman of this Company. At the Board Meeting which will follow the Annual General Meeting I shall be vacating the Chair in favour of Mr. W. C. Handley, B.Sc., M.I.E.E., a colleague of mine for many years and one whose long connection with the industry and with this Company in particular makes him a most suitable choice as Chairman of the Board.

To fill the vacancy created by my resignation from the Board it is proposed to appoint Dr. L. G. Brazier, B.Sc., Ph.D., M.I.E.E., who, through his wide experience of research in the electrical industry, should make a valuable contribution in the technological field.

The report and accounts were adopted and the proposed increase of capital and scrip issue were sanctioned. 4274

A.E.I. Lamp & Lighting Co. Ltd....	12	Electrical Power Engineering Co.	42	McGregor, Robert, Ltd.	54	Savage Transformers Ltd.	78
A.F.S. Developments	30	(B'ham) Ltd.	42	Mercury Switch Mfg. Co. Ltd.	24	Sax, Julius, & Co. Ltd.	57
Aeru Electric Tool Mfg. Co. Ltd....	56	Electrical Remote Control Co. Ltd.	54	Mersey Cable Works Ltd.	29	Service Electric Co. Ltd.	120
Aircraft-Marine Products (Gt.		Electro Appliances & Equipment		Metropolitan Tool & Products Ltd.	53	Simmonds Bros.	32
Britain) Ltd.	80	Ltd.	92	Metway Electrical Industries Ltd....	35	Simmonds & Stokes (Niphan) Ltd....	32
Appelbe, J. F., & Co. Ltd.	86	Electroflux Ltd.	101	Midland Dynamo Co. Ltd.	35	Simplex Electric Co. Ltd.	98 & 99
Asquith Electrics (Colne) Ltd.	26	Elhay Tubes Ltd.	73	Midland Electric Mfg. Co. Ltd.	70 & 71	Sims, F. D., Ltd.	53
Associated Electrical Industries Ltd.		Ellison, Geo., Ltd.	23	Midland Silicones Ltd.	32	Smith, Frederick, & Co.	25
5, 17, 20, 48 & 102		English Electric Co. Ltd.	65, 66 & 67	Mole, M., & Son Ltd.	57	Smith & Nephew Ltd.	4
Associated Fire Alarms Ltd.	24	Erskine, Heap & Co. Ltd.	3	Monmore Tubes Ltd.	10	Souplex Ltd.	26
Association of Steel Conduit Mfrs.	75			Nalder Bros. & Thompson Ltd.	94	Stanton Ironworks Co. Ltd.	Cover 2
Austinite Ltd.	46	Ferranti Ltd.	91	Nettle Accessories Ltd.	44 & 45	Steatite & Porcelain Products Ltd.	9
Avo Ltd.	1	Flexello Castors & Wheels Ltd.	85	Nife Batteries	64	Sturdy Electric Co. Ltd.	57
				Norwood Steel Equipment Ltd.	96	Sturtevant Eng. Co. Ltd.	7
						Suffex Ltd.	88
Bank Bridge Rubber Co. Ltd.	58	Gaskell & Grocott Ltd.	26	Oddie, Bradbury & Cull Ltd.	96	Techna (Sales) Ltd.	119
Barries Electrical Agencies Ltd.	113	General Electric Co. Ltd.	Cover 4, 72 & 104			Telegraph Condenser Co. (Coy. Mfg.)	117
Bendix Home Appliances Ltd.	26	Greenwood Airvac Conduits Ltd.	41	Parmiter Hope & Sugden Ltd.	103	Tetra Eng. Co. Ltd.	22
Birch, H. A., & Co. Ltd.	96	Grover & Co. Ltd.	58	Parsonage, W. F., & Co. Ltd.	120	Thorn Electrical Industries Ltd.	55
Birmingham Specialities Ltd.	24			Parvalux Ltd.	33	Tok Electrical & Industrial Mecha-	46
Bleoco Ltd.	26	Hampson Industries Ltd.	36	Phillips Electrical Ltd.	32	nisms Ltd.	96
Bray, E. N., Ltd.	36	Hampton Works (Stampings) Ltd.	53	Phillips Control (G.B.) Ltd.	83	Transformer & Electrical Co. Ltd.	120
Bridge, David, & Co. Ltd.	76	Harbore' Rubber Co. Ltd.	27	Pirelli-General Cable Works Ltd.	14	Universal Electrical Co.	22
Brigdes, S. N., & Co. Ltd.	54	Harvey, G. A., & Co. (London) Ltd.	60	Plannair Ltd.	6	Utilities (London) Ltd.	73
British Micranizing Co. (Gt. Barr)		Hayward, F. C., & Co. Ltd.	14	Portable Furnace & Patents Co.	37	Varilectric Ltd.	93
Ltd.	31	Heaybird, F. C., & Co. Ltd.	118	Power Centre Co. Ltd.	97	Vernier Mfg. Co. Ltd.	80
Brook Motors Ltd.	87	Higley Burnowes & Co. Ltd.	15	Preformed Line Products (Gt.)	13	Volex Electrical Products Ltd.	16
Brookthirst Igranic Ltd.	79	Higgs Motors Ltd.	119	Britain) Ltd.	61	Westminster Eng. Co. Ltd.	14
Brotherhood, Peter, Ltd.	77			Pyrotenax Ltd.	95	Wootton & Co. Ltd.	21
Brush Electrical Eng. Co. Ltd.	34	Insuloid Mfg. Co. Ltd.	81		95		
Bulvers Ltd.	85	International Combustion Ltd.	47	Radiation Ltd.	43	Yarrow & Co. Ltd.	11
Bylock Electric Ltd.	120	International Rectifier Co. (Gt.)	29	Radiospares Ltd.	50	Zenith Electric Co. Ltd.	54
		Britain) Ltd.	56	Record Electrical Co. Ltd.	59		
Carr, James W., & Co. Ltd.	96	Irish Cables Ltd.	68	Reyrolle, A., & Co. Ltd.	86		
Carter Gears Ltd.	85	Ismay Lamps Ltd.	69	Rheostatic Co. Ltd.	16		
Channel Conduits Ltd.	64			Robinson, D., & Co.	29		
City Electrical Co.	2	Jeary Electrical Co. Ltd.	50	Robunda Ltd.	86		
Combination Metallic Packing Co.		Jelson Electric Ltd.	38	Rowlands Electrical Accessories Ltd.	21		
(1921) Ltd.	18 & 19	Johnson, Matthey & Co. Ltd.	62		62		
Connollys (Blackley) Ltd.	100	Johnson & Phillips Ltd.	28		28		
Courteney, Pope (Electrical) Ltd.	60	Kempston Electrical Co. Ltd.	56		50		
Craig & Derricott Ltd.	40	Lancashire Dynamo Electronic Pro-	68		59		
Crompton Parkinson Ltd.	51	ducts Ltd.	96				
Cryseico Ltd.	60	Lead Development Association	93				
		Lister, R. A., & Co. Ltd.	86				
De Berque Machine Tools Ltd.	74	Litholite Insulators & St. Albans	16				
"Diamond H" Switches Ltd.	118	Mouldings Ltd.	29				
Docker, John, & Co. (Engineers)		Lock, A. M., & Co. Ltd.	86				
Ltd.	120	Londex Ltd.	21				
Donovan Electrical Co. Ltd.	56	Lumitron Ltd.	62				
Drummond, John (Engineers) Ltd.	74	Lyons, Claude, Ltd.	28				
Dubilier Condenser Co. (1925) Ltd.	52		50				
Du Pont Company (United King-		M K Electric Ltd.	28				
dom) Ltd.	90	Macfarlane Engineering Co. Ltd.	56				
		Macintyre, James, & Co. Ltd.	90				
Easco Electrical (Holdings) Ltd. ...	94						
East London Mica Works	30						
Elcordia Ltd.	56						
Electric Elements Co.							

Advertisement copy and blocks for printing in black and white

should reach us 16 days preceding date of issue addressed to

Electrical Review, Dorset House, Stamford Street, London, S.E.1

TIMERS by the RODENE

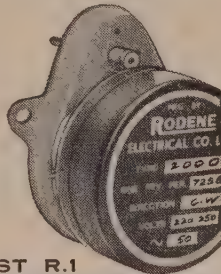
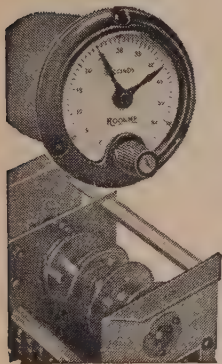
See them all on

STAND B76

AT THE
INSTRUMENTS
ELECTRONICS
AND
AUTOMATION
EXHIBITION

WRITE FOR LIST R.1

Sole Distributors:
D. ROBINSON AND COMPANY
717 LONDON ROAD, HOUNSLOW, MIDDLESEX.
Tel.: HOUNSLOW 6266-6267 & 8336



"BARLECTA"

STOP/START SWITCHES, FIRE ALARMS
LIMIT SWITCHES, Etc.



Ask
for
List No.
1458/ER



We can quote for FRACTIONAL H.P. MOTORS against enquiry

BARRIES ELECTRICAL AGENCIES, LTD.
KEMP TOWN, BRIGHTON 7

H.B. TRANSFORMER TAPPING SWITCH TYPE L



Interlocked with micro
break switch

Pull Handle to re-
lease Lock, then turn
Also Type O with-
out interlock and
Type C for on load
switching

SINGLE OR MULTI POLE
Phone: Kings Norton 1604

HENLEY BURROWES & CO. LIMITED

Factory Centre: KINGS NORTON, BIRMINGHAM

JOHN DOCKER & Co. (ENGINEERS) Ltd.

MANUFACTURERS OF

CABLE MAKING MACHINERY

BUNCHING & TWINNING M/CS.
24" & 18" DIA. BOBBINS

STRANDING & LAYING-UP M/CS.

PAY-OFF & TAKE UP STANDS
16" TO 8'0" DIA. DRUMS

SPIRAL MARKING MACHINES
FOR PLASTIC COVERED CABLES

EXTRUDING SCREWS

CROMWELL WORKS
NORTH FELTHAM TRADING ESTATE
FELTHAM, MIDDLESEX.

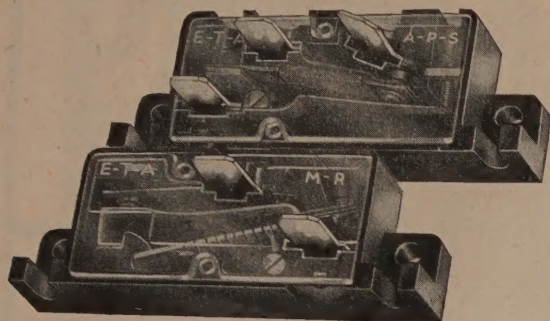
TEL.: FELTHAM 6341/3

E-T-A

MINIATURE MOTOR STARTING AND PROTECTION DEVICES

A.P.S. START WINDING SWITCH

A completely reliable current operated device which disconnects motor starting winding. It can be mounted in any position and will fit easily inside the end shield of the motor.

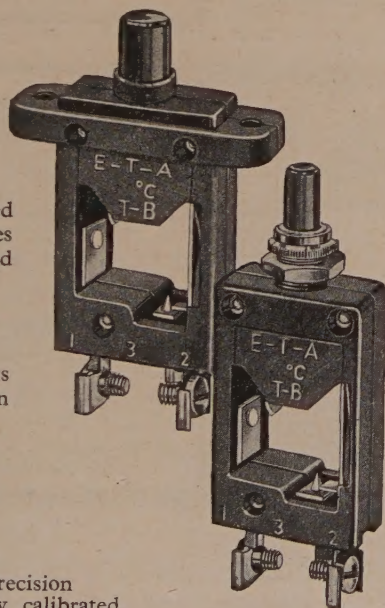


M.R. MOTOR PROTECTION RELAY

An automatically resetting overcurrent protection device which will limit temperature rise of motor windings and prevent burnout.

A.P.S. and M.R. units are suitable for motors with normal load currents of between 100 milliamps and 15 amps.

E-T-A TEMPERATURE LIMITERS



Units can be supplied to trip at temperatures between 60°C. and 120°C.

Tolerance $\pm 5^{\circ}\text{C}$.

Normal load currents of up to 15 amps can be disconnected.

See our catalogue Section 7/58.

All E.T.A. units are precision built and individually calibrated.

We also supply a wide range of miniature overcurrent protection devices for single, 3 phase A.C. and low voltage D.C. circuits.

Please write to us for our catalogue or any technical information with regard to your own circuit protection problems.

TECHNA (SALES) LTD.

47 WHITEHALL, S.W.1

Telephone: WHITEHALL 1348/9

YOU ARE INVITED TO VISIT US AT **STAND Q746**
INSTRUMENTS, ELECTRONICS AND AUTOMATION EXHIBITION

NOW



ONE-TWO
AND
IT'S DONE



Comparison with a three-penny piece gives some indication of the very small size

Insuloid

miniature

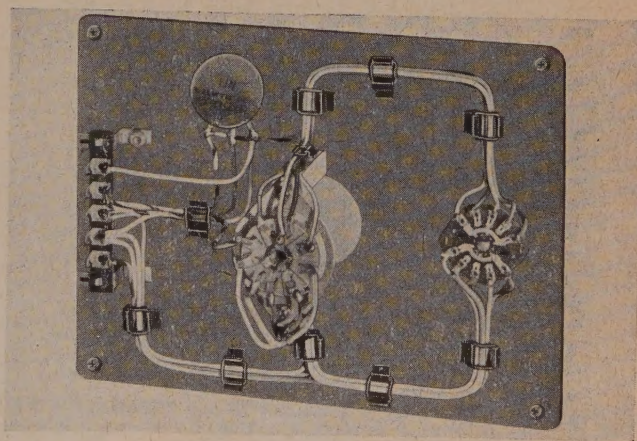
cradleclip

to meet
the needs of
electronics
and all
very small
wiring

The Miniature Cradleclip system revolutionises small wiring installation.

Designed especially for Electronics and all very small wiring with the object of considerably reducing wiring time, and is absolutely foolproof in application and completely safe and permanent in operation, even in extreme climatic conditions.

Miniature Cradleclip will accommodate up to either three 3/16" cables or 20 runs of 1/16" dia. covered wire, and has all the "one-two and it's done" slickness of its big brother, the now firmly established CRADLECLIP system from which it has developed.



ALL THESE ADVANTAGES:

- Cuts wiring time by 52%.
- Combines high speed fixing with simplicity and complete security.
- Brings a new versatility, compactness and neatness to your wiring.
- Completely insulated and suitable for all climates.
- Electrical and mechanical security in all conditions.
- The Cradleclip system has been proved in wiring installations throughout the world.
- Wiring modifications are quickly and easily carried out.

TWICE AS GOOD . . .

TWICE AS QUICK . . .

**WHEN YOU WIRE
WITH CRADLECLIP**

Send for fully descriptive literature on the Insuloid Miniature Cradleclip Wiring system now, and also find out about other Insuloid time and money saving products.



INSULOID MANUFACTURING CO. LTD.

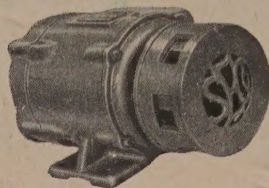
Sharston Works, Leastone Road, Wythenshawe,
Manchester. Tel.: WYT 2842 & 3163

WARNING!

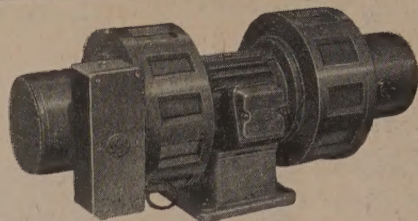
EMERGENCY calls for an immediate infallible alarm system—the Secomak range of electric syrens meets this demand, their extensive use on oilfields, airports, at atomic power plants, in harbours and in factories and buildings of all kinds has proved their effectiveness and dependability.

Secomak
REGD.

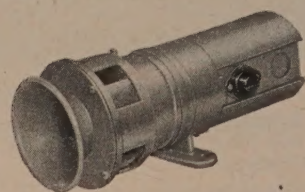
**ELECTRIC
SYRENS**



Flameproof syrens fitted with Buxton Certified motors (Groups 1, 2 & 3 gases) as used at petrol refineries and jetties and other dangerous situations.



Coded syrens (or whistles) having exclusive signalling features—clearly defined short and/or long blasts ($\frac{1}{2}$ h.p. to 12 h.p.)



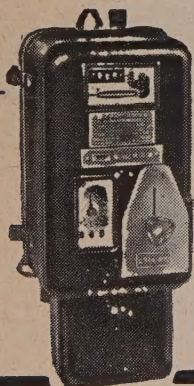
G.P.I. Small powerful syren, ideal as industrial fire warning or general alarm. Low voltage model for fire engines and Police cars.

For specific details of the complete range of electric syrens write for Data Sheet 251

SERVICE ELECTRIC CO. LTD.

SECOMAK WORKS, HONEYPOT LANE, STANMORE, MIDDLESEX. Tel.: EDGware 5566/9

HOUSE SERVICE METERS



Credit Pattern
and Prepayment Type
200-240 v. A.C. S/Ph 50c. (& D.C.)
AVAILABLE FROM STOCK
POLYPHASE 400-440 v. 3-wire Type
Ex Stock

UNIVERSAL ELECTRICAL CO.
217-221 City Road, London, E.C.1

DONOVAN

ELECTRICAL WHOLESALEERS

**For MOST INDUSTRIAL
and DOMESTIC ELECTRICAL
SUPPLIES**



THE DONOVAN ELECTRICAL CO. LTD.
(WHOLESALE DIVISION)
75-82 GRANVILLE STREET, BIRMINGHAM 1
DAY and NIGHT Phone: MIDland 9441

A.I.D.

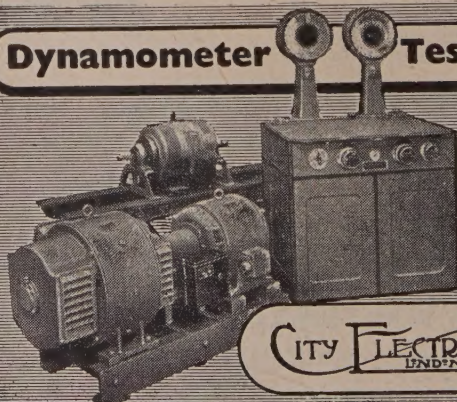


Approved

TRANSFORMERS of all types up to 25 kVA for Single or Three Phase operation, Phase conversion, etc.
MAINS Output and Special Purpose Transformers for Radio Equipment, Chokes, etc.
COILS for Contactors, E.M. Brakes, Air Valves, etc. and COIL WINDINGS for all purposes.
SOLENOIDS for A.C. and D.C. Operation.

W. F. PARSONAGE & CO LTD
INDUCTA WORKS
PARK RD. BLOXWICH WALSALL
TELEPHONE: BLOX. 76464

Dynamometer Test Rigs



CITY ELECTRICAL CO
LONDON

EMERALD STREET, LONDON, W.C.1. HOLBORN 9722

SMOOTH PASSAGE

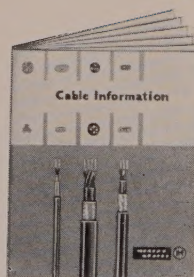


—but when it's a question of passing current from one point to another, whether in general purpose wiring, low tension power distribution or special industrial applications, Mersey Cables are called for.

As the cable manufacturing Company in the Electrical Division of the Tube Investments Group, Mersey have acquired long experience and incomparable skills. Their wide range embraces many advanced types including shaped conductor plastic insulated mains cables and solid conductor wiring cables. PVC general purpose cables are now being made to the new BS2004 and these, like Mersey's range of communications cables, embody the highest standards of reliability; furthermore, the latest and most efficient methods of production enable them all to be produced at economical cost.

Whatever your particular requirement, specify MERSEY, the first choice of practised cable users.

cable information



is a handbook recently produced by Mersey Cable Works and is devoted entirely to data concerning cables, their functions and applications. This invaluable and comprehensive guide to the most efficient use of cables is readily supplied on request.

**MERSEY
CABLES**



Mersey Cable Works Limited

Liverpool 20 Telephone: Bootle 4111

A  COMPANY

contemporary

lighting

fittings

by

G.E.C.

for contemporary living

Fittings styled for simplicity in a wide choice of designs. Gay colour combinations that harmonise effectively with modern interiors and furnishings.



THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2